FRY'S PURE CONCENTRATED COCOA.

THE PRACTICAL TEACHER

DR. C. W. KIMMINS.

CONTENTS
OF THE
OCTOBER NUMBER.

THE BRITISH ASSOCIATION 163
N.U.T. NOTES 167
NOTES FROM THE NORTH 168
THE CHIEF INSPECTOR OF THE LONDON COUNTY COUNCIL 170
A SCAMPER THROUGH FINLAND. By J. E. Parrott, M.A., LL.D. 171
THE NEW ANNOTATED CODES 175
A NEW HISTORY AND SURVEY OF ENGLISH LITERATURE 175
NATURE NOTES FOR THE MONTH 176
NOTES OF LESSONS ON FRUITS AND SEEDS 178
OUR ILLUSTRATED GEOGRAPHICAL NOTEBOOK 181
THE NEW CAPITAL OF AUSTRALIA 182
PRACTICAL HELP IN THE ARITHMETIC LESSON. By George Collar, B.A., B.Sc. 183
THE INSPECTOR'S NOTEBOOK 184
A SCHOOL JOURNEY IN THE PEAK DISTRICT. By Catherine I. Dodd 186
EXPLANATIONS AND SUGGESTIONS FOR CARRYING OUT THE OCCUPATIONS IN CONNECTION WITH THE ILLUSTRATED CORRELATED SCHEME OF WORK FOR AN INFANTS' SCHOOL 188
SINGING IN INFANT SCHOOLS 192
OUR SUPPLEMENT 194
ON THE STUDY OF GERMAN 195
DIFFICULTIES OF FRENCH IDIOMS AND CONSTRUCTIONS. 195
FRENCH PRIZE COMPETITION 196
OUR PUPIL TEACHERS' AND SCHOLARSHIP COURSE. By A. T. Flux 197
OUR CERTIFICATE COURSE FOR 1905 201
CHEMISTRY 204
PHYSIOGRAPHY 205
THEORETICAL MECHANICS 206
OUR QUERY COLUMN 207
THE EDITOR'S TABLE 209

·VOL· XXV No.4

EDITORIAL, PUBLISHING AND ADVERTISING OFFICES OF "THE PRACTICAL TEACHER" 35 & 36 PATERNOSTER ROW, LONDON, E.C. NEW YORK OFFICE, 37 EAST EIGHTEENTH STREET.

PRICE 6D.

Just Ready. *"The British Isles."* (*"World and its People" Series of Geographical Readers.*) *See page xiv.*

MESSRS. BELL'S EDUCATIONAL BOOKS

Complete Educational Catalogue post free on application.

MODERN MATHEMATICAL BOOKS.

THE TEACHING OF ELEMENTARY MATHEMATICS, being the Report of the Committee of the Mathematical Association. 6d. net.

NEW SCHOOL ARITHMETIC. By CHARLES PENDLEBURY, M.A. With or without Answers, 4s. 6d.; or in Two Parts, 2s. 6d. each.

*** The New School Arithmetic is to a great extent a new book, and not merely a revision of the present work. The original Arithmetic will also be kept in print, and will be revised and kept up to date with each new edition, as hitherto.

NEW SCHOOL EXAMPLES IN ARITHMETIC. Extracted from the above. With or without Answers, 3s.; or in Two Parts, without Answers, 1s. 6d. and 2s.

ELEMENTARY ALGEBRA. By W. M. BAKER, M.A., and A. A. BOURNE, M.A. 4s. 6d. Also in Parts.

PART I. To Quadratic Equations. With Answers, 3s.; or without Answers, 2s. 6d.

PART II. To include Logarithms (four-figure tables), Binomial Theorem, Exponential and Logarithmic Series, Interest, Undetermined Coefficients, and Partial Fractions. With or without Answers, 2s. 6d.

The complete book and the parts will be published with and without Answers, and Teachers' copies will also be issued, with the Answers to each set of Examples printed opposite them.

EXAMPLES IN ALGEBRA. Extracted from the above. With or without Answers, 3s.; or Part I. separately, without Answers, 1s. 6d.

EXAMPLES IN ALGEBRA. By C. O. TUCKEY, M.A. Fourth Edition. With or without Answers, 3s.

ELEMENTARY GEOMETRY. By W. M. BAKER, M.A., and A. A. BOURNE, M.A. Complete Third Edition revised, 4s. 6d. Also in Parts. Books I.—III., Sixth Edition revised, 2s. 6d. Books I.—IV., Fourth Edition, 3s.

Also published in the following forms:—

Book I., 1s. Books I. and II., 1s. 6d. Books II. and III., 1s. 6d. Books III. and IV., 1s. 6d. Books II.—IV., 2s. 6d. Book IV., 1s. Books IV. and V., 2s. Book V., 1s. 6d. Books IV.—VII., 3s. Books V.—VII., 2s. 6d.

ANSWERS TO NUMERICAL AND MENSURATION EXAMPLES, 6d. COMPLETE KEY, 6s. net.

ELEMENTARY GRAPHS. By W. M. BAKER, M.A., and A. A. BOURNE, M.A. 6d. net.

EXAMPLES IN PRACTICAL GEOMETRY AND MENSURATION. By J. W. MARSHALL, M.A., and C. O. TUCKEY, M.A. With or without Answers, 1s. 6d.

A NEW TRIGONOMETRY FOR SCHOOLS. By W. G. BORCHARDT, M.A., and the Rev. A. D. PERROTT, M.A. 4s. 6d. Also in Two Parts, 2s. 6d. each.

The authors hope that this book will supply the need felt for a Trigonometry based on *four-figure Logarithm Tables*, the authorities responsible for the various Cambridge Examinations, Army Entrance Examinations, etc., now dispensing with seven-figure Logarithms. The book lays stress on the more *practical parts* of the subject. *Squared paper* is freely made use of, and 600 Miscellaneous Examples are provided.

BELL'S SCIENCE SERIES.

ELEMENTARY BOTANY. By PERCY GROOM, M.A., D.Sc., F.L.S., Lecturer on Botany at Cooper's Hill. Fourth Edition. With 275 Illustrations. Crown 8vo, 3s. 6d.

THE STUDENTS' DYNAMICS. Comprising Statics and Kinetics. By G. M. MINCHIN, M.A., F.R.S., Professor of Applied Mathematics at Cooper's Hill. 3s. 6d.

ELEMENTARY INORGANIC CHEMISTRY. By JAMES WALKER, D.Sc., Ph.D., F.R.S., Professor of Chemistry in University College, Dundee. Second Edition, revised, 3s. 6d.

INJURIOUS AND USEFUL INSECTS. By L. C. MIALL, F.R.S., Professor of Biology in the Yorkshire College. With 100 Illustrations. 3s. 6d.

AN INTRODUCTION TO THE STUDY OF THE COMPARATIVE ANATOMY OF ANIMALS. By G. C. BOURNE, M.A., Fellow and Tutor of New College, Oxford. With numerous Illustrations.

Vol. I. ANIMAL ORGANISATION. The Protozoa and Coelenterata. 4s. 6d.

Vol. II. The Coelomata. 4s. 6d.

AN INTRODUCTION TO CHEMISTRY. By D. S. MACNAIR, Ph.D., B.Sc. Crown 8vo. Third Edition. Revised, 2s.

CHEMICAL LABORATORIES FOR SCHOOLS. Hints to Teachers as to the Method of planning and fitting up a School Laboratory, and of conducting a School Course in Chemistry. With Plan of a simple Physical Chemical Laboratory for twenty pupils. By D. S. MACNAIR, Ph.D., B.Sc., Author of "An Introduction to Chemistry." Sewed, price 6d.

BELL'S FRENCH COURSE.

By PERCY ATHERTON, M.A., Assistant Master at Haileybury College. In Two Parts. With numerous Illustrations. Crown 8vo, 1s. 6d. each.

"The lessons are thoroughly progressive and exceedingly intelligent in their points. The selections for reading exercises are well chosen, and the lessons in grammar not only complete the book, but help towards its value as a teaching medium. In every sense the volume is a success."—*Practical Teacher.*

HANDBOOKS OF ENGLISH LITERATURE.

Edited by PROFESSOR HALES.

Crown 8vo, 3s. 6d. each volume.

THE AGE OF CHAUCER (1346-1400). By F. J. SNELL, M.A. With an Introduction by Professor HALES.

THE AGE OF SHAKESPEARE (1579-1631). By THOMAS SECCOMBE and J. W. ALLEN. 2 vols. Vol. I. **Poetry and Prose.** Vol. II. **Drama.** Second Edition, revised.

THE AGE OF MILTON (1632-1660). By the Rev. J. H. B. MASTERMAN, M.A. With an Introduction, etc., by J. BASS MULLINGER, M.A. Second Edition.

THE AGE OF DRYDEN (1660-1700). By R. GARNETT, C.B., LL.D. Second Edition.

THE AGE OF POPE (1700-1744). By JOHN DENNIS. Fourth Edition.

THE AGE OF JOHNSON (1744-1798). By THOMAS SECCOMBE. Second Edition.

THE AGE OF WORDSWORTH (1798-1832). By Professor C. H. HERFORD, Litt.D. Third Edition.

THE AGE OF TENNYSON (1830-1870). By Professor HUGH WALKER, M.A. Third Edition.

HISTORY OF THE ENGLISH LANGUAGE. By T. R. LOUNSBURY, Professor of English in Yale University. New Edition, revised. xiv. and 505 pages. 12mo, 5s.

INTRODUCTION TO ENGLISH LITERATURE. By HENRY S. PANCOAST. 556 pages. 12mo, 5s.

A HISTORY OF GERMAN LITERATURE. By KUNO FRANCKE, Professor of German Literature in Harvard University. Fourth Enlarged Edition, 8vo, 10s. net.

London: GEORGE BELL & SONS, York House, Portugal St., W.C.

THE

PRACTICAL TEACHER

A MONTHLY MAGAZINE AND REVIEW

FOR THE SCHOOL-ROOM AND THE STUDY

Vol. XXV. No. 4. OCTOBER, 1904. Price 6d.

NOTICES TO CORRESPONDENTS AND SUBSCRIBERS.

"The Practical Teacher" may be ordered of any Newsagent or Bookseller, or at any Bookstall, in the United Kingdom or in the Colonies. Supplies are sent monthly to the chief towns in Australasia, South Africa, and India.

London Office: 35 and 36 Paternoster Row.

Edinburgh Office: Parkside Works.

New York Office: 37 East 18th Street.

Paris: W. H. Smith and Son, 248 Rue de Rivoli.

Subscribers may obtain "The Practical Teacher," post free, from the Publishers at the following terms:—

United Kingdom, Continent, Colonies, and United States } 12 Months, 8/- 6 Months, 4/-

All literary communications should be addressed to the Editor, Office of "The Practical Teacher," 35 and 36 Paternoster Row, London, E.C.

Remittances, Cheques, Post-Office Orders, etc., should be made payable to Thomas Nelson and Sons. Advertisement rates on application.

THE BRITISH ASSOCIATION.

THE annual meeting of the British Association took place this year at Cambridge, and about two thousand persons were present in the Corn Exchange to hear the presidential address delivered by Mr. Balfour. The fact that the Prime Minister should consent to act as President, and that ten years ago the late Lord Salisbury presided at the Association's meeting at Oxford, shows that the importance of the influence of science on all concerns of life, including government, is fully recognised. Among the eminent scientific men present were Lord Kelvin, Lord Rayleigh, Lord Avebury, Sir W. Huggins, Sir A. Rücker, Sir H. Roscoe, Sir A. Geikie, Sir W. Ramsay, Professor Carey Foster, and Professor G. H. Darwin; while the distinguished foreigners included Professors Becquerel, Bruhl, and Von Greth.

The retiring President, Sir Norman Lockyer, read a telegram of greeting from South Africa, and then introduced his successor, who proceeded to read his speech.

The address had for its title "Reflections suggested by the New Theory of Matter," and was on the following lines. He spoke of the appropriateness of the university town of Cambridge as the place for holding the meeting of the British Association for the Advancement of Science, on account of the illustrious list of men of science who had studied and taught there, and he instanced Newton, Young, Stokes, Maxwell, Kelvin, Rayleigh, and J. J. Thomson. But these men were not, as is often inaccurately said, seeking for "laws connecting phenomena." Since the word "phenomena" is a Greek word, and means that which appears, it is not only inconvenient but confusing to describe as "phenomena" things which do not appear, which never have appeared, and which never can appear to beings so poorly provided as ourselves with the apparatus of sense perceptions. The object of research of the physicist is a physical reality—"a reality which may or may not be capable of direct perception—a reality which is in any case independent of it—a reality which constitutes the permanent mechanism of that physical universe with which our immediate empirical connection is so slight and so deceptive."

Mr. Balfour then contrasted the view of matter held at the end of the eighteenth century with that held at the end of the nineteenth. The first was that the universe consisted of ponderable matter scattered in different combinations through space, and in spite of the experiments and conclusions of Rumford, one would have admitted the existence of an imponderable substance called heat, of two electrical "fluids," and of streams of corpuscles forming rays of light.

The establishment of the undulatory theory of light by Young led to the recognition of the all-pervading ether. But the recognition of the ether led to the modification of the view of radiant heat, which, as well as the electric waves used in wireless telegraphy, differed from light, not in kind, but in the magnitude of the undulations alone. During the next century this idea of the universe was consequently modified not only by the discoveries of the atomic and molecular constitution of matter, the kinetic theory of gases, and the laws of the conservation and dissipation of energy, but by a recognition of the more and more important part which electricity and the ether occupy in any representation of ultimate physical reality. Running briefly through the history of electricity, Mr. Balfour came to Professor Larmor's suggestion that the electrical monads, which seem to form the basis of all matter, are but a modification of the universal ether—a modification roughly comparable to a knot in a medium which is inextensible, incompressible, and continuous. "Two centuries ago electricity seemed but a scientific toy. It is now thought by many to constitute the reality of which matter is but the sensible expression. It is but a century ago that the title of an ether to a place among the constituents of the universe was authentically established. It

COMPOSITION BY PICTURE

SUPPLEMENT

Presented with this Number.

seems possible now that it may be the stuff out of which that universe is wholly built."

If this view be correct, then mass can no longer be regarded as a fundamental property of matter, but can be explained as a relation between the electrical monads of which matter is composed and the ether in which they are bathed. The view also has an important bearing on the question of the distribution of solar energy, for the chemical action and gravitation which are used as the explanation of the apparently exhaustless streams of energy radiating from the sun are as nothing compared with the energy residing in the atoms themselves.

This led up to the main ideas in the address—namely, that knowledge is advanced not merely by observation and experiment (*pace our "heuristic" philosophers*) treated by rigid reasoning, but also by speculations. "Now and again it happens that observation and experiment are not treated as guides to be meekly followed, but as witnesses to be broken down in cross-examination. Their plain message is disbelieved, and the investigating judge does not pause until a confession in harmony with his preconceived idea has, if possible, been wrung from their reluctant evidence." So great a logician as John Stuart Mill spoke with contempt of those who saw any difficulty in the acceptance of the doctrine of action at a distance, but it was to Faraday's obstinate disbelief in the doctrine that we owe some of the crucial discoveries on which both our electric industries and the electric theory of matter are ultimately founded; and at the present day many physicists are searching for an explanation of gravity, and refuse to be content with the belief that it is a simple and inexplicable property of masses acting on each other across space. Referring to the philosophical question of whether the primary and secondary properties of matter are either or both inherent in matter itself, or due to the action of our senses, Mr. Balfour said:—"We claim to found all our scientific opinions on experience, and the experience on which we found our theories of the physical universe is our sense-perception of that universe. That is experience; and in this region of belief there is no other. Yet the conclusions which thus profess to be entirely founded upon experience are to all appearance fundamentally opposed to it. Our knowledge of reality is based upon illusion, and the very conceptions we use in describing it to others, or in thinking of it ourselves, are abstracted from anthropomorphic fancies, which science forbids us to believe and nature compels us to employ." Having thus stated a far-reaching paradox, the President began to look for a solution. He admitted that inductive logic was but an "exceedingly thin intellectual fare" to sustain the seekers after truth, for in order of causation, as opposed to logical sequence, our sense-perceptions are due (in part) to the constitution of our organs of sense. What we see depends not merely on what there is to be seen, but on our eyes. Now these and other sense organs have been evolved by natural selection, but the theory offers a very inadequate explanation, for natural selection works through utility, and our powers and organs have been developed directly or indirectly to help us to fight, eat, or to bring up children. Our organs of sense-perception were not given us for purpose of research, hence it is presumably due to these circumstances that the beliefs of man about the material surroundings in which he dwells are not only imperfect but fundamentally wrong. Whatever explanation we may give of the constitution of the universe, the long-drawn sequence of causes and effects gives no satisfying explanation of the nature of knowledge itself. "The more imposing seems the scheme of what we know, the more difficult it is to discover by what ultimate criteria we claim to know it. Here, however, we touch the frontier beyond which physical science possesses no jurisdiction. If the obscure and difficult region which lies beyond is to be surveyed and made accessible, philosophy, not science, must undertake the task."

With this apology for wandering beyond the actual domain of physical science, the Premier brought his address to a conclusion.

The day after the President's inaugural address the Association resolved itself into sections for the discussion of papers on different subjects.

Section A.—Mathematics and Physics.

This section was presided over by Professor Horace Lamb of Victoria University, who gave a very fine opening address. He made some appreciative remarks on George Salmon and other mathematicians and physicists who have recently passed away, and particularly on the late G. G. Stokes. He showed the great work done by Stokes in bringing mathematical deduction and physical speculation into harmony. The work of Lagrange, Laplace, and Fourier had advanced pure and mixed mathematics enormously; but by making such assumptions as that a solid body was a conglomeration of discrete particles acting on one another at a distance with lines of force joining them, they made the logical carrying out of the ideas extremely difficult. Stokes applied mathematical calculations to the solution of problems in physical optics, acoustics, and electricity, and reduced them to a quantitative form, and checked his result by direct experiment. Such were the results arising from this method that it seemed a great mistake to attempt to keep the theoretical and the practical in two distinct compartments. The tendency in modern mathematics was to discuss very fundamental points, and not to treat formulæ as something to be hurried through so as to get to their application as quickly as possible. The ascendency of Greek mathematics is illustrated by the way in which we idealise our conceptions of physical bodies; in astronomy, for instance, treating a planet as though it were a so-called material particle—that is, a mathematical point associated with a suitable numerical coefficient. "Geometry, like mechanics, is an applied science, and it gives merely an ingenious and convenient symbolic representation of the relations of actual bodies; and whatever might be the *a priori* forms of intuition, the science, as we have it, could never have been developed except for the accident that we live in a world in which rigid, or approximately rigid, bodies are conspicuous objects. On this view the most refined geometrical demonstration could be resolved into a series of imagined experiments performed with such bodies, or rather with their conventional representations."

The professor disputed the assertion that the first rude beginnings of geometry dated from the Egyptians. The dawn of geometric ideas was to be traced among the prehistoric races, who carved rough but thoroughly artistic outlines of animals on their weapons. "Whoever he was, the man who first projected the world into two dimensions, and proceeded to fence off that part of it which was reindeer from that which was not, was certainly under the influence of a geometrical idea, and had his feet in the path which was to culminate in the

refined idealisations of the Greeks. Among the latter, lines came to be spoken of having no breadth, and thus it became possible to make exact statements in accord with the Greek love of definiteness. "If any one scientific invention could claim pre-eminence over all others," said Professor Lamb, "I should be inclined to erect a monument to the inventor of the mathematical point as the supreme type of that process of abstraction which has been a necessary condition of scientific work from the very beginning."

A word of warning was given as to the dangers of graphical representations which are now being taken up with so much enthusiasm. We must admit the great assistance this method has proved in engineering, and the pure mathematician can testify to the influence it has exercised in the development of many branches of analysis. Modern analysts had discovered, however, that it might prove a snare, for in the act of drawing a curve to represent an analytical function we unconsciously make a whole host of assumptions which are difficult not only to prove but even to formulate with precision.

In conclusion, Professor Lamb thought it would be a great pity if mathematicians were to insist too strongly on having demonstrative proof of all the fundamentals. It might even be claimed that the services which geometry had rendered to other sciences has been almost as great in virtue of the questions which it implicitly begged as of those which it resolved.

Later on a very interesting paper was read by Professor W. Wien of Würzburg, in which he described some experiments he had carried out to decide whether the ether moves with the earth or not. The principle involved was that if the ether moved with the earth the velocity of a ray of light would be different according to whether the ray travelled in the same direction as the earth or not. The experiments followed Foucault's method of determining the velocity of light.

Section B.—Chemistry.

In this section great interest was manifested in a short note by Sir W. Ramsay on some experiments with radium bromide. He said he had collected 105 milligrams of radium bromide, which, being too precious to risk in one vessel, were divided amongst three bulbs. These bulbs were placed in glass vessels, and each provided with a tube to take away emanations. The vessels were colourless to start with, and were some of soda and some of potash glass, but in course of time the latter became brown, and the former violet in colour. The glass, too, became radio-active; but this property was removed by washing with water, although the colour remained. When a solution of radium bromide was evaporated, an invisible residue was left which was radio-active, and dissolved to a radio-active solution. Radium formed chloride, sulphide, hydroxide, and sulphate similar to those of lead, except that they were radio-active. Radium emanations rendered silver and platinum as well as glass radio-active.

Section E.—Geography.

The opening address of this section was given by Mr. Douglas Freshfield, who took for his subject "Mountains and Mankind." This was so full of interest that we hope to give it at length later on. A valuable paper on the methods of topographical surveying was read by Major Close, and was followed by a discussion in which considerable differences of opinion were expressed on the value of photography in surveying.

The following day a paper prepared by M. Charles Rabot was read by the president. It dealt with the subject of "Glacier-bursts," and described the effect of the outburst of great masses of water which have been pent up in glacier districts by some obstruction in the narrow part of the valley. Enormous quantities of matter, and frequently large numbers of trees, are carried along from the upper regions, and deposited in places where the force of the rush is diminished, owing to the diminution of the angle of slope. As such glacier-bursts must have been very frequent during the glacial epoch, frequent mistakes must have been made in studying the Pleistocene formations through not taking account of them.

Mr. W. A. Andrews dealt with geographical object lessons, and explained a plan for arranging a series of object lessons, illustrated by lantern slides, each lesson dealing with one aspect of geography—such as peaks, passes, glaciers, coast-lines, regions of vegetation, etc. It is proposed to prepare a short pamphlet on each subject, explaining the maps and views, and containing suggestions as to their use. It is hoped that the first two sets—peaks, glaciers, and passes in the Alps—will be ready for use in September. The paper gave a general sketch of the aims and constitution of a typical set, including geographical and political maps of the Alps and their main subdivisions, maps showing river-basins, railways, etc., with views of characteristic natural features.

Section L.—Educational Science.

Of course the section that naturally affords most interest to our readers is the one that deals with education. This has been under the presidency of such eminent men as Sir John Gorst, Professor Armstrong, and Sir William Abney, and this year the president was the Bishop of Hereford, who is not only an eminent ecclesiastic, but has held the important educational posts of Head-master of Clifton, President of Trinity College, Oxford, and Head-master of Rugby.

In the course of his address he sketched the ideal of true education, and outlined the views of Plato and Milton. The teacher must be scientifically trained, but his personality must come into play. If education were treated too exclusively according to the analytic, naturalistic methods of scientific men, the danger was incurred of unfitting teachers for the best part of their work, which depended on the inspiring influence of personal ideals breathing through all their lessons, on a vivid sense of the subtle element of personality in the pupil, and on their responsible exercise of the power of their own personality. In giving the scientifically-educated teacher the analytic knowledge of the dissecting chamber, he might possibly be robbed of the magnetic power of personal sympathy and influence. In this sense, at all events, he must not be dehumanised. The most eminent psychologists, the critics told us, were beginning to recognise the danger, and they bid the educator beware of science which had a good deal to say about mental processes, but took too little account of the emotions and the will, and seemed inclined to forget that men were personalities, and not plants, or trees, or machines, and that boys would be boys. He was convinced that our English education needed more light from every quarter, particularly from those who were familiar with scientific methods; and on looking back on his own educational work, he felt fully conscious that he would have done it far less imperfectly if in his youth he had undergone any rational scientific illuminating preparation for it.

The speaker regretted that Matthew Arnold's advice

and warning had not been attended to. We were suffering now from a lack of systematic training of teachers, a want of interest in education, and the excessive influence of tradition in our universities and great schools.

Party politics, especially ecclesiastical politics, must be eliminated from the domain of education. Education must suit each individual child to whom it is given. More attention must be paid to the physical health of the lower classes, while the excessive cult of fashionable athleticism by the middle and upper classes should be avoided.

Dr. Percivall then proceeded to review the condition of education in England at the present day. Taking the elementary school first, he remarked that it did too little to draw out and stimulate the faculties or to form the tastes of each individual child. Classes were still too large, and the child missed the help and stimulus of some personal recognition or distinction, and more attention was required to ethical teaching and to that moral and spiritual teaching which develops and strengthens the character and tastes, and which is the greater part of life. He regretted the waste caused by a system which allowed a poor boy to end his education at twelve, when in the nature of things it should be only beginning.

In the sphere of secondary education there was still greater need of guidance, and the new educational authorities should study what was being done in Germany, Switzerland, the United States, and Denmark. It would greatly expedite progress if the Government would offer more liberal secondary education grants to efficient schools, and initial grants towards buildings and scientific equipment, to be met by contributions from local rates or other local sources, public or private. The example of the progress made by such a poor country as Denmark was held up for imitation.

Turning to the public schools and the schools which are preparatory to them, the bishop urged that the latter should be liable to public inspection and report, and that a license should be required in every case, which should be withheld if the staff, sanitary arrangements, and educational equipment of the premises were not satisfactory. In the public schools there was undoubtedly a great waste, owing to the poor teaching of untrained masters. He would require all masters to be trained and registered, and he appealed to all existing masters and mistresses in the leading schools to apply for registration. One of the chief defects in our public school education was to be found in over-attention to memory work, and in the comparative failure to develop powers of thought, taste, and interest in the things of the mind. Even in the teaching of languages attention has been too exclusively devoted to questions of grammar. Nine out of ten of our public-school boys seemed never to get through the grammatical vestibule at all.

The speaker then argued that boys stayed too long at the public schools; they ought to enter the university at seventeen, or even at sixteen, and the university colleges should make special arrangements to receive them at that age. He also compared the day system with the boarding system, and thought those boys had the best education who enjoyed all the advantages of the cultivated home, and at the same time, through the arrangements made for them, all the best elements in the life of a great boarding school.

In dealing with the universities, the speaker noted the great influence they had upon school curricula through the scholarships and exhibitions they offered, and contended that this influence would be productive of much more good if in the matriculation examination—(*a*) candidates were free to offer some adequate equivalent in place of Greek; (*b*) an elementary knowledge of some branch of natural science and of one modern language were required of all candidates; (*c*) a knowledge of some period of English history and literature were required, and ability to write English tested; (*d*) the examination in Latin and any other foreign language were to include questions on the subject-matter of any prepared books offered, some questions on history and literature and translation of easy passages not previously prepared; (*e*) marks of distinction were to be given for work of superior merit in any branch of this examination.

The paper concluded with a hope that the committee of the section would carry on inquiries and collect matter during the interval between the annual meetings.

The discussion on the question of school-leaving certificates lost much of its effect inasmuch as the proposals of the consultative committee of the Board of Education had not been fully considered, and it was felt that recommendations might be out of place. The general feeling, however, was that more attention should be given to the teacher's estimate of his own pupils than is usually the case.

At the next meeting the question of the training of teachers came up for discussion. Mr. Henry Hobhouse, M.P., opened with a paper on the "Training of Teachers in its Relation to the Local Authorities," and claimed that it was impossible to bind a teacher to serve in the district where he was trained, and that it would be undesirable even if it were possible, and therefore the onus of training teachers should be borne by the Imperial Exchequer.

Sir John Gorst took part in the discussion, and said it was ridiculous to decide before the student was trained whether he was to be an elementary, a secondary, or a technical teacher; and he objected fundamentally to this attempt to divide education into these three water-tight compartments. He said there was no difficulty in obtaining teachers in Ireland, and he looked to that part of the United Kingdom as a source of supply.

Mr. Oscar Browning said that the worst enemies of the training colleges were the curricula sent from the Board of Education. Whenever an educational fad arose there was an attempt to force it on the teachers of elementary schools, and to make it a part of the training-college course. For twelve years the institution with which he was connected had sent out elementary teachers who were thoroughly trained university men, and he denied that pupil teachers were not fit for university education. Neither was it the fact that the students receiving such education deserted the career of an elementary school teacher. The best results had been secured by training elementary and secondary teachers together.

Liège International Exhibition.—The Board of Education have been informed through the Foreign Office that an exhibition of works of art under the patronage of the King of the Belgians will be arranged in a special pavilion within the exhibition grounds of the Universal and International Exhibition to be held in Liège in 1905.

Full particulars as to the conditions attaching to exhibits, which will include paintings, sculpture, engravings, and architectural designs, are given in the official regulations, which can be obtained on application to the Consul-General for Belgium, 29 Great St. Helens, E.C.

BY MANY HANDS.

"Quot homines, tot sententiæ."

N.U.T. NOTES.

AUGUST'S closing days witnessed that comparatively rare event a special Executive meeting. It was summoned in order to consider the new secondary school regulations, as well as matters concerning the training of pupil teachers, training colleges, and evening continuation schools. It was on my own motion that this special meeting was held; but after the event, one must reluctantly acknowledge that a small committee of six or eight members would probably have served the purpose equally well, if not better than the whole Executive. The September meeting was remarkable only for something in the nature of a full-dress discussion on underfed children, introduced by our educational protagonist, Dr. Macnamara, M.P., whose eloquence was hardly necessary to persuade the Executive to place on the Conference agenda a motion dealing with this vital subject. I trust the question will have a prominent place at Llandudno, and this can only be secured by a general recognition of its urgency by the associations affiliated to the Union.

Two Executive Meetings.

MR. A. R. PICKLES, B.A., received a few nominations last year for the Vice-Presidency of the Union, although, as every one knows, he did not go to the poll. This year he must be regarded as a serious candidate, and is certain of a very large measure of support. Readers of the *Practical Teacher* may recollect how splendidly he has acquitted himself, year by year, at the Easter Conferences; and after Portsmouth it was universally recognised that Mr. Pickles was a man bound to "arrive." At Russell Square he has worthily fulfilled the duties of chairman of two of the most important standing committees—Organisation and Education. He is described by his friends as a "splendid worker, powerful speaker, tactful and forceful." From an intimate knowledge of him and his work, I can honestly say this is no mere jactitation, but naked truth, understated if anything. Messrs. Blackburn, Phillips, and T. P. Sykes are also in the field, in addition to Mr. Pickles, so that a keen struggle for the Union's blue ribbon is assured. Fortunately for the Union, whichever gentleman heads the list six months hence, a keen and capable chief administrative officer is an absolute certainty.

A New "V.P." Candidate.

THERE is ever a fluttering in the dovecotes when promotions are at hand. It is unfortunately true that a large number of class teachers must remain so, through no fault of their own, all their professional lives. The case of the men is, for obvious reasons, worse than that of the women; for the latter leave the profession in large numbers, frequently in order to complete the happiness of one of the sterner sex. So far as my personal knowledge goes, the custom of the leading educational authorities has been, for many years, to fill up all vacancies for head-teacherships from the members of their own staffs. One might consult hundreds of back numbers of the *Schoolmaster* without finding a single advertisement for either head-master or head-mistress from any of the principal school boards or their successors. The principle on which they have made their appointments has been thoroughly just and sound. It is well known that in every large town or city there are scores of capable men and women, occupying subordinate positions in the schools, who only want the opportunity of exhibiting their aptitude for a different (if not higher) sphere of usefulness and responsibility. Their educational and academic qualifications are equal to those of the head-teachers, and their experience stretches from ten to fifteen (and perhaps twenty or more) years as certificated teacher. During all this time they have laboured zealously at a ridiculously low salary, hoping against hope that Fortune's wheel would give one turn in their direction. In a Midland city which I need not name there lately arose a vacancy for a head-master. The original (and wise) intention of the Education Committee was undoubtedly to appoint a member of their own staff, for only the teachers in their service were invited to apply. But a gentleman who left the profession eighteen months previously was first of all permitted to send in an application, and next appointed, to the disappointment and probably disgust of all the class teachers in the town. No possible exception can be taken to him personally. He had been a successful head-master in the city for over seventeen years, and was a good Unionist, who had done magnificent work for his profession; yet the soreness is very great. My own decided view is that it is the *absolute duty* of the Education Committee to grant all appointments to head-teacherships to men and women at present in the service, so long as these are properly qualified. To block the avenue to promotion is as unfair as it is discouraging to the hard-working and energetic members of the local teaching profession.

Teachers and "the Open Door."

THERE are individuals who delight in criticising the N.U.T. because it has done some little in trying to secure fair remuneration and reasonable conditions of service for its members. They talk of the "selfishness" of the teachers' organisation, forgetting all the time that this salary question is one of first class educational importance to the nation. I tried to prove this in my Bristol presidential address, claiming that the parents of our children have an indubitable right to demand as the educators of their sons and daughters the very best men and women the country can produce—men and women of the greatest natural ability, the broadest sympathy, the highest personal culture and refinement. To secure the services of these, reasonable emoluments must be offered to all who are properly qualified, whilst the plums or prizes of the profession ought to be considerably increased. At this very moment, so scanty are the stipends of the certificated class teachers that in hundreds (and possibly thousands) of instances teachers are compelled to accept appointments in evening continuation schools in order to provide for the exigencies of dress, continued self-culture, and a modest standard of comfort at home. Both day and evening school managers are bound to lose by the transaction, and they cannot but know it. I state to-day, with little fear of contradiction, that if there be one set of individuals who *ought* to enter on their daily duties with minds free from personal worry

Salaries.

and anxiety—and especially financial anxiety and embarrassment—surely it is the teachers, not so much for their own sakes as for the sake of the little ones entrusted to their charge. Any one who has spent much time in a school knows how largely the children are a reflex of the teacher. If the teacher be nervous, harassed, or irritable, we may safely assume that the children will be nervous, harassed, and irritable also. Even if the members of the various Education Committees in the country were disposed to have but little consideration for the teachers, they might evince some for the children, bearing in mind, at the same time, that far more willing and satisfactory service is naturally forthcoming from a contented body of public servants than from those keenly resentful of the low financial estimate placed on their labours, and compelled to waste valuable time in public agitation for better conditions of service. The knowledge of these facts has caused the Executive of the Union to remit the whole salary question to its standing Education Committee, which, under the able secretaryship of Mr. Ernest Gray, M.P., performs magnificent work, of which the average member of the Union has little or no notion.

* * *

Wonderful Progress.

EVERY endeavour has been made to collect and collate at the Union's offices all available information regarding scales of salaries. The putting into effect of the 1902 Education Act has led to the compilation of scales in districts where they did not exist heretofore. These scales have been published under the headings of—(1) Administrative Counties, (2) County Boroughs, (3) Urban Districts, (4) Non-County Boroughs; and "second editions" have been called for, in order to keep the information quite up to date. The following figures show the progress which is being made. The figures in the first column show the number of districts in which scales had been adopted when the first editions were prepared, the figures in the second column the number of districts in which scales are now in existence.

Administrative Counties (63)...	Heads.....	18.....	35
	Assistants.....	19.....	41
County Boroughs (69).....	Heads.....	45.....	58
	Assistants.....	54.....	65
Non-County Boroughs (144)....	Heads.....	56.....	88
	Assistants.....	73.....	108
Urban Districts (50).....	Heads.....	31.....	47
	Assistants.....	36.....	52

It will be noticed that the authorities of the county boroughs have almost concluded their labours in this direction, whilst those of the administrative counties are furthest in the rear. These last-named have undoubtedly great difficulties to contend with, though there is certainly no excuse for the delay in introducing a scale for certificated class teachers. The Union's Standard Rate is a sure and satisfactory guide, about which there can be no possibility of mistake. I imagine that the county authorities find the varying types and sizes of their schools a stumbling-block; yet a few able men would soon find a proper solution. In any case, full recognition should be given to the fact that a small school requires the services of teachers of experience, and the labour of conducting such a school is often greater than the work involved in a school of double the size. Therefore, whether accommodation or attendance be the fundamental factor in determining scales of salaries, full regard should always be had to the position of those teachers who will work but with one or possibly two or three assistants, and who will, therefore, be themselves not only responsible for the conduct of the school, but will have to teach daily two or three small classes.

* * *

Olla Podrida.

IN certain districts, and particularly in our large towns and cities, the nature of the surroundings and the character of the children's homes make the schools far more difficult to work than those of the average type. My last school was a splendid example of a "school of special difficulty," although, unfortunately, no adequate provision was made for the full recognition of the additional labour thrown upon my colleagues. The children came from the worst slums in this city, many of them resident in lodging-houses, the offspring of hawkers, "here to-day and gone to-morrow." The late Nottingham School Board certainly showed its appreciation of our difficulties by appointing a strong staff, but it ought to have gone a step further.

"How should the salaries reach the teachers?" is a question often debated; and, in my opinion, they should be actually taken to the schools and handed over to *each individual teacher* either by a "pay clerk" or a duly appointed school treasurer. Certainly the most objectionable of all methods is that which requires the teachers to attend the Education Committee's offices to receive their stipends. The local authority have no right to ask the teachers to sacrifice their hardly-earned leisure in journeying to the offices. It falls peculiarly heavily on all teachers living far from the offices, and I am convinced that no Education Committee would adopt this plan did the members once realise what it means to a mistress, say, after a long day's work in the school, to journey some considerable distance after school hours, and before she is able to obtain a meal, and possibly in wet, boisterous weather, to obtain the wages she has earned. Happily, this most objectionable practice is very rarely adopted, and it ought to become extinct.

I have previously pointed out in these "Notes" the evils of "joint appointments," and I am heartily pleased to find that the practice of making them is everywhere decreasing. The fact that the Code now stipulates that all agreements must be in writing is undoubtedly exercising some influence, whilst it also appears that in certain districts the Board of Education are pressing for a separate appointment of teachers to infant classes. The question of the employment of married women in schools is one on which various and diverse views are held, but there can be no two opinions about the justice of remunerating a woman for the services she renders the community, whether she has pledged herself to make a man happy, or whether she has not. A. C.

NOTES FROM THE NORTH.

Secondary Education.

THE thirteenth Annual Report on Secondary Education in Scotland possesses a peculiar significance, inasmuch as it is the final report (the superstitious will perhaps find some connection between the thirteenth and final) which will appear over the signature of Sir Henry Craik, and in all probability will be among the last in which the subject of secondary education will be treated in a separate volume and apart from the rest of education. Had the Bill of 1904, as many of us fervently hoped, become law, it would have been the last, but we trust that this honour is reserved for 1905. It is a matter of congratulation that the progress made in recent years with regard

to secondary education has been maintained, and that the instances, which were not uncommon in the earlier years of inspection, where a school had become thoroughly inefficient by defects in methods or by unwillingness to deal courageously with a system which required radical reform, have practically disappeared.

❧ ❧ ❧

THE report shows that the number of secondary and preparatory schools inspected this year was one hundred, of which thirty-two were higher class public schools under the management of School Boards, twenty-four endowed schools, and forty-four under private management—whether that of a governing body or of a proprietor. Under the Minute of April 27, 1899, £24,200 were allocated in grants to eighty-seven of these schools, as against £26,250 last year; while grants from committees of burghs and counties under Section 2 (1) (*b*) of Education and Local Taxation Account (Scotland) Act of 1892 amounted to £21,980, 14s. 5d., and grants from Scotch Education Department for Science and Art reached the sum of £11,430, 19s.: in all a total of £57,611, 13s. 5d. On the rolls there was a grand total of 17,921 against 17,856 last year, while the average attendance was this year 16,507 against 16,264 last year. The percentage of attendance this year is 92, as compared with 91 last year, and 85·21 of the elementary schools this year. Of the 17,921 on the rolls, 9,107 were over fourteen years of age. This proportion, while it cannot be considered too high, shows on the part of many Scottish parents a most laudable desire to extend their children's education beyond the legal minimum.

Statistics.

❧ ❧ ❧

WHILE the Department has always deemed it important to maintain a high standard throughout the schools, the inspection held has not aimed at moulding the schools according to one uniform type. According to the Code, wide discretion is given to the managers of secondary departments connected with primary schools; while, with regard to the secondary schools, the Department has all along evinced a desire that local authorities should feel themselves free to vary the curriculum according to local needs. Occasional suggestions may have been given, but these suggestions were not intended to limit the initiative or the responsibility of local managers. The selection of inspectors, too, has been made with this in view. Provision has been made for a certain continuity of judgment by allowing the same person to visit a school several times, while criticism from a fresh mind has been secured by altering the inspector of each school from time to time.

Liberty of Curriculum.

❧ ❧ ❧

READERS of the *Practical Teacher* will be interested to know how the report deals with this subject. Absolute discretion has been given to the inspectors in regard alike to the methods of examination followed and to the points selected for particular observation, but they have been directed to give special attention to the pronunciation of modern languages. While a salutary effect has resulted from the measure adopted by the Department two years ago—namely, the making of the issue of leaving and intermediate certificates to individual pupils in every school dependent upon a satisfactory oral examination—nevertheless it is maintained that many teachers do not yet fully realise how extremely important this side of modern language study is from the educational no less than from the practical point of view. It appears to be taken for granted too frequently that pupils can learn by more or less haphazard imitation, without any attempt being made to give them systematic instruction in the formation of individual sounds, or definite guidance as to how to deal with combinations of syllables.

Modern Languages.

❧ ❧ ❧

ON the whole, while satisfactory progress has been made, there are many points in regard to which further improvement is desirable. The premises of the secondary schools do not in all cases compare favourably with those of primary and higher grade schools, the standard of which has in recent years been greatly raised. Local effort is essential for the proper equipment and prosperity of secondary schools, and it is considered that a more liberal expenditure might be made from the rates. School Boards are charged with showing timidity about incurring expenditure from a fear that it may be considered to be an affair which interests one class only, and not the whole community. Then there is the danger of unduly multiplying the number of secondary schools, and thus producing a wasteful overlapping of agencies. The tendency to dissipate grants in small payments over a large number of schools, the proper function of which is primary rather than secondary education, requires to be checked. It is a matter of considerable regret that, where liberal educational provision has been made, the inspectors have so often to lament the withdrawal of pupils at an age too early to benefit fully by it. It is, indeed, one of the most serious difficulties against which secondary education in Scotland has to contend. The only remedy, it is maintained, lies in the growth of a more enlightened public opinion.

Points requiring Attention.

❧ ❧ ❧

FOR some time past there has been growing dissatisfaction in Scotland regarding the defective education of youths entering upon a mercantile career. This the Department looks upon as a thoroughly healthy sign, inasmuch as it means that commercial men are more and more realising the supreme importance of a sound mental training. The remedy for the present state of matters lies in the hands of business men. The educational machinery of the country can never have a fair chance until merchants in a body set their faces against the practice of putting boys into business at 14, and until, in their selection of apprentices, they give preference and reasonable encouragement to those who can produce evidence of having profited by their school training. To this, rather than the institution of fresh examinations, the country must look if it desires that lads should enter business properly qualified for the work of life. By the issue of commercial and technical certificates the Department has plainly shown that it takes a deep interest in the subject, and it bespeaks the sympathy and co-operation of the business community by obtaining some practical recognition of the certificates by business firms.

Commercial Education.

❧ ❧ ❧

IT remains to be added that by far the most serious feature which the reports of the inspectors reveal is the continued steady growth of overpressure in the upper classes of many of the secondary schools. Inquiries made in different parts of the country show that, under existing circumstances, it is no uncommon thing for boys, and

Over-Pressure—

even for girls, to spend five or six hours nightly on home lessons. It must be obvious that the nervous strain entailed is excessive, and that it cannot fail to react unfavourably on the intellectual, no less than on the physical, development of at least a certain proportion of the pupils. Since attention was first called to the matter, a year ago, individual head-masters have, in some cases, made strenuous endeavours to organise home lessons in such a way as to prevent undue pressure. These efforts have had beneficial results up to a certain point, but something more than isolated action is required.

* * *

Its Cause and Cure.

THE ultimate cause lies in the effort to attain a very high degree of efficiency in too wide a range of subjects. So long as the standard in each remained comparatively low, no evil effects were perceptible. Now that it has risen considerably, the adoption of some principle of selection has become imperative. The tension can only be relieved by the introduction of greater elasticity into the curricula of the most advanced classes. A serious difficulty in the way of such a change appears to arise from the system by which the allocation of university bursaries is at present determined. There are not wanting signs, however, that those most directly interested are becoming alive to the extent of the danger.

* * *

Educational Home Rule.

FREQUENT efforts have of late been made by educationists and politicians to bring the Scotch Education Department more into touch with the country by having headquarters in Scotland. This has to some extent been accomplished by the appointment of Mr. George Macdonald, M.A., at present Assistant Director of Higher Inspection, to act as assistant secretary in Edinburgh. He will enter on his duties in October next. The headquarters of the Department in Edinburgh are to be at the Museum of Science and Art. Cynical people have suggested that there is some connection with Scotch education and the Museum. At the same time, Captain Alan Foster, late of the Argyll and Sutherland Highlanders, has been appointed Inspector of Physical Education of Higher Schools and Departments in Scotland. He will also inspect the classes in this subject in the training colleges, as well as those for the further instruction of teachers, conducted under Article 91 (*d*) of the Code. I much regret this latter appointment. I thought we had had enough of the Army Model Scheme, and that a teacher would have been offered this appointment. It is a decided step in the wrong direction. The time for appointing inspectors from the ranks of teachers is now at hand, and I feel certain it would be better for Scottish education in all departments.

* * *

E.I.S. Doings.

THE annual meeting is now with us, and already there are indications of a most successful wind-up for the year. The membership has made a very great increase, and the funds are in a most healthy condition. This year there is a balance of £408, 8s. 9d. on the general funds, and £162, 16s. 10d. on the Benevolent Fund. The amount now standing to the credit of the Institute is £6,647, 2s. 7d. I have frequently in these notes referred to the need for "a local habitation and a name;" and now that we have an organising secretary, it is time we had a building of our own in Edinburgh. The funds are now able to stand it, and the Institute is doing itself no good in the eyes of the public by continually delaying this work. In view of the new headquarters of the Education Department in Edinburgh, it would be an excellent opportunity for us showing that we also desire headquarters. "*Festina lente*" is a good motto, but sometimes it can be overdone. It will rest with the annual meeting, no doubt, to broach the subject, but really something should at once be done. The funds could not be applied to a better purpose.

THE CHIEF INSPECTOR OF THE LONDON COUNTY COUNCIL.

IT has been predicted that the administration of education under the London County Council will differ from that under the School Board in that the Education Committee will confine its attention to broad matters of policy, and will lay down principles and leave the carrying out of these in detail to permanent officials.

A glance at an agenda paper of the School Board or of one of its committees was enough to show that the Board kept under its direct control a mass of detail with which no member who had anything else to think of could profess to be familiar.

The Council has done its best to secure competent

DR. C. W. KIMMINS.

men for the chief offices, and we are sure that as head of the inspectorial staff the appointment of Dr. C. W. Kimmins will be welcomed.

The new chief inspector hails from the north, where, after thorough preparatory work, he became a student at Owens College, Manchester. He has been brought into contact with two of the foremost chemists of the day—Sir Henry Roscoe, who was his professor at Manchester; and Sir William Ramsay of University College, with whom he worked subsequently at Bristol. In 1881 he gained an entrance scholarship to Downing College, Cambridge, and at the end of his course took a distinguished place in the Natural Science Tripos, and also

obtained the degree of B.Sc. at London University. He was then appointed chief science master at the Leys School, Cambridge, under the late Dr. Moulton, and did much towards establishing the reputation of that school. The appointment was of special service to Mr. Kimmins, for it enabled him to carry on research work with Mr. Pattison Muir of Caius College, Cambridge, with such success that he gained the degree of Doctor of Science of London University.

Soon after this, Dr. Kimmins took up another branch of teaching in the form of lectures under the auspices of the University Extension Committee. The brilliancy of his experimental work and the lucidity of his exposition made his lectures extremely popular, and in 1894, when Dr. R. D. Roberts left London for Cambridge, Dr. Kimmins succeeded him as director and secretary of the London Society for the Extension of University Teaching, and about the same time was appointed Inspector of Science Teaching under the Technical Education Board of the London County Council.

With these two appointments one would think that Dr. Kimmins's hands were full; but he nevertheless found time to do a great deal of valuable social work in connection with the Bermondsey Settlement. The admiration and sympathy which kindred spirits feel for one another when engaged in common benevolent work led to his marriage with "Sister Grace," whose name is so well known in South London as that of a lady who was devoted to the service of the poor, and particularly of the helpless crippled children.

The work of inspection of science schools and classes aided by the Technical Education Board began to assume large dimensions, and consequently, when the London University Extension Society transferred its work to the London University, Dr. Kimmins relinquished his office, and became Chief Inspector to the Technical Education Board.

Dr. Kimmins has taken an active part in all matters concerning the welfare of London University, and under the new constitution he has been elected a member of the Senate, as a representative of the faculty of Science. He has done much to organise conferences on the teaching of science, and is always pleased to hear the views of individual teachers. His new position is one of great responsibility and difficulty, but he is imbued with high ideals, and knows how to set about reaching them, so the Council will have an efficient officer; while such are his suavity and his sympathy with those who have to perform the more laborious parts of the educational work, that we are sure all London teachers will soon come to regard him as their "guide, philosopher, and friend."

SUPPLEMENTAL REGISTERS FOR TEACHERS.—In September 1902 the Board of Education referred to the Consultative Committee the question of drafting regulations for the establishment of Supplemental Registers for teachers of special subjects. The committee has given very prolonged and earnest consideration to this matter; and after a conference with the Teachers' Registration Council, a joint sub-committee, including representatives in equal numbers of these two bodies, was appointed to consider proposals for draft regulations for these Supplemental Registers. The report of this sub-committee was recently received and considered; and as a result the Consultative Committee, at their last meeting before the recess, resolved to recommend to the Board of Education that the establishment of Supplemental Registers be postponed until the teaching of the subjects proposed for the Supplemental Registers has been further organised in connection with general education. The Board of Education have accepted this recommendation, and for the present no further steps will be taken to establish such Supplemental Registers.

A SCAMPER THROUGH FINLAND.

BY J. EDWARD PARROTT, M.A., LL.D.

"I AM going to Finland," I said.

"Why Finland?" asked my travelled friend. "Nothing to see there, surely! a dreary, boggy, foggy, outlandish country, next door to the North Pole."

"Wait a minute. What do you think of this?—

'O Finland's heir, thy land is fair
And bright from bound to bound;
Her seas serene; no gayer green
On tree or lea is found.
Her sun's a blaze of golden rays,
Her night an eve star-crowned.
O Finland's heir, no land more rare
Or nobly fair is found.'

That's a bit of one of their national songs, translated by A. P. Graves, of Father O'Flynn fame," said I. "Doesn't that make you change your opinion?"

"Not a bit of it," replied my friend. "Mere poetic license that need not be endorsed. You hardened versifiers could do just as well with Margate for a theme. What! made up your mind? Well, good-bye. I hope you won't be disappointed, but I hae my doots. One final warning. Don't talk politics, or it will be Siberia and not Finland that you'll see."

FINNISH PEASANT GIRL.

This was not encouraging. Nevertheless I went to Finland, and I have returned simply amazed at the prevalence and persistence of erroneous opinion with regard to a country only four or five days' sail away. Mr. Barrie tells us in one of his delightful books that an English lady asked a Highlander if it was *really* true that wild boars raged about the streets of Inverness in the winter time.

"Quite true," said the Scot, "quite true; and the Highlanders are obliged to go out and shoot them down with claymores."

There is about as much truth in this statement as there is in the current ideas about Finland.

Let me then dispel a few illusions. Finland is as much hotter than England in summer as it is colder in winter. Instead of being dreary, it is a country of unique beauty, with a history and associations of the most interesting kind. The people are thoroughly civilized—frequently highly educated—proud, sensitive, intensely patriotic, excellently mannered, and, especially in the east, hospitable and friendly to a degree. Every Finlander can read; and good reason why—he cannot marry until he can satisfy his pastor that he possesses so much erudition. Finnish towns rejoice in all the so-called resources of civilisation, including a telephone in your bedroom. When I say that you can buy picture postcards even in remote places, who will deny Finland's claim to be included in the tourist's itinerary?

Topelius—"Uncle Topelius," as the Finnish children call that cunning weaver of fairy tales—has a beautiful account of the origin of the "Land of a Thousand Lakes." He tells us how the gods showered their gifts on other countries and left poor little Finland out in the

cold. They had little sunshine and fertility left, and no more jewels and gold to give, so they dowered her with beauty instead. They gave her lakes to mirror back what sun there was, emerald islands to float on the bosom of the waters, stately trees in overwhelming abundance, and wild flowers and berries in brilliant profusion to deck her in the brief days of summer.

It is quite true that Finland has none of the garish glories of Switzerland; her beauty is not of the bold, compelling order. Her great charm is her sweet placidity. She does not exhilarate; she soothes, and her best boon is a sweet restfulness. But do not imagine that she is monotonous. Far from it. She has primeval forests, lordly lakes, sounding cataracts, flashing streams, and sunsets so unspeakably lovely that one gazes on them with a rapture that is little short of positive awe.

I shall not abuse the present occasion by inflicting geographical facts upon my reader. Let these suffice:—Finland is larger than the United Kingdom with the Netherlands thrown in; 8 per cent. of the country is cultivated; 60 per cent. consists of hills and woodland, 20 per cent. of swamps and moors, and 12 per cent. of water. In the far north there is a range of mountains which attains in one peak a height of 4,000 feet. These mountains subside as they stretch southward into a rock-studded plain, which only in one place rises a thousand feet above the level of the sea. There are 2,700,000 people—that is, about nineteen to the square mile.

We (my wife and I) sailed for Finland from Stockholm, "the Venice of the North"—a Venice without smells or stagnant canals, with eighty odd miles of fresh-water lake to the rear and the island-studded Baltic at the front door; a Venice with puffing little steam-launches for gondolas, and busy commercial Swedes for incorrigibly idle lazzaroni.

Stockholm is unquestionably one of the most beautiful capitals in the world; but that is another story. We booked berths on the *Bora II.*, one of the sumptuous steamers plying between the Swedish capital and Finland. At the booking office my passport was impounded, and I was promised its return when the Russian police had examined it at Abo.

For two or three hours we threaded the maze of islands that, like the veil of a coy beauty, piques one's expectation of the lovely Northern city, and then the dinner-bell rang. The first course was the national *smörgåsbord*, a sort of *hors d'œuvre*, but certainly a "square" if erratic meal for the ordinary Briton. Some wag has suggested that the motto for passengers on ocean-going steamers is, "You can't have your cake and eat it;" but here, on this glassy summer sea, the veriest landlubber that ever went on a voyage could have no qualms. So we proceeded with the smörgåsbord.

The large central table was covered with rows of attractive dishes—salmon in multitudinous forms, trout, radishes, sliced cucumber, caviare, smoked reindeer, hard-boiled eggs, mushrooms in cream, omelets, slices of cold eel in jelly, tongue, ham, potted meat, and so forth. At one end of the table stood a large silver samovar containing *brannvin*, a local liqueur to which everybody devoted himself according to his needs and desires. Then the diner possessed himself of a plate, a knife and fork, and perambulating the table, harpooned such odds and ends as he fancied. He then carried his loaded plate to the dining-table and set to. An ordinary Finlander—and his appetite is prodigious—has two or three helpings as a sort of preliminary canter before settling down to the regular courses which follow. Perhaps this description of the smörgasbord does not sound very appetising, but I must confess that it grew on me, and the verb *to smörg* (quite unknown to the Swedish language) entered largely into my vocabulary. "Age did not stale nor custom wither the smörgåsbord's infinite variety."

Modified daylight does duty for summer night in these high latitudes. As we sailed for Finland the western horizon was one broad band of living gold against which the outline of a sailing-ship was sharply silhouetted, while the sea beneath was a sapphire of almost unearthly splendour. Soon we found ourselves amidst the clustering Aland Isles, and an hour or two later we entered the intricate channels of the Finnish Archipelago. Islands to the right of us, islands to the left of us, islands to the front of us—islands of every shape and form—bare, sombre bosses of wave-washed granite, stony little islets with a solitary pine tree rising like a faultless spire, and in the distance not easy to distinguish from a sailing-ship; large islands with a ragged forest of firs, amidst which the trunks of silver birch gleamed like a pale phosphorescence. We seemed to be sailing in a lake of dreams.

Approaching Abo.

It almost passed belief to recollect that from October to May these summer waters are an arctic waste, so thickly frozen that a beaten track across the ice marks the road from Finland to Sweden. Ever and anon a lighthouse winked at us from a promontory; now and then our engines stopped as we glided through an opening between rocks so narrow that the proverbial biscuit could easily have been tossed ashore on either hand. On and on we sailed, and soon the sun was above the horizon again, and all was broad, blazing day.

Our course was clearly marked by tall iron rods, so painted as to indicate depth. As we drew nearer to the coast the islands grew bigger and bigger, their forests denser and denser. It appeared simply marvellous how the trees, "tall as is the mast of some high ammiral," could draw their sustenance and stately strength from the hard, bare crag. But they do, flinging knotted arms across the rock and drawing abundant life out of the very stone.

Here, thought I, is a parable. As with the trees so with the people of these lands. Nature is a niggard—she gives no favours except a man wrestle with her; and yet she is a nursing mother, for out of the bitter comes forth the strong—a people of thew and sinew and rugged independence, long foresight and unyielding determina-

tion. In these rugged isles she has bred vikings who in heroic days sped their war keels to the shores of favoured lands, who hewed their way to the gates of Imperial Rome itself.

The islands now begin to show signs of human habitation. Villages appear, villages of wooden houses, dropped indiscriminately without any scheme or plan on the edge of the tideless sea, all gaily painted, red, yellow, and blue. The long, narrow boats with up-curving prows drawn up on the shore bespeak the amphibian character of their inhabitants, and the strings of wood-laden lighters, which a panting little steamer urges towards the sawmills, indicate the chief source of their livelihood.

Now we see summer residences perched on rocks overlooking the water or half hidden amidst the foliage at the head of a lovely creek. All are of wood, but every style of architecture is attempted. All have balconies and sun-blinds and painted boat and bathing houses by the water. A Crusoe-like existence in one of these beautiful retreats seems for the moment the ideal method of spending the brief weeks of idlesse that a strenuous work-a-day life begrudges.

With something like regret we see the Abo landing-place. The city is a mile or two inland. On the wharf is an imposing array of Russian officials, white-bloused, gray-coated, top-booted, each with a perfect arsenal by his side, and a galaxy of medals upon his breast. Surely, you think, the government must have sent a posse of generals to meet us. But no! these are merely police and custom-house officers. We are eager to go ashore, but tedious formalities forbid. The captain is the first to cross the gangway, and his object is to deliver a bundle of passports to attest the *bona fides* of his passengers. Most of them are the little books possessed by all the Czar's travelling subjects. In these the coming and going, and the reasons for the same, are carefully entered, signed, checked, and countersigned by a horde of officials, who thus profess to know the precise whereabouts of the 126 millions of Russians whom they misgovern.

At last the passports are pronounced all correct, and a blue-uniformed police officer, bedizened with red cords, takes his stand at the gangway and calls out the names of the passengers. They come at the call, receive their papers and a sharp scrutiny into the bargain, and then are free to take their luggage into an adjoining shed for the customs' examination. We being simple tourists, with guileless countenances, are not troubled much; but the Czar's Finnish subjects have their belongings probed to the quick. Here is a Finnish lady whose Noah's ark is being searched. Her garments, dainty things with frills and furbelows, are all closely investigated by the not over-clean hands of the custom-house officer. Now he pounces on a book, and at once carries it to a spectacled personage sitting at a desk. This individual turns over leaf after leaf, and finally confiscates it. The work is perhaps calculated to unsettle the minds of the Czar's lieges, and therefore cannot be admitted into the country. Perhaps it speaks of lands in which men and women have a share in the government, perhaps it mentions tax-collecting without the intervention of the knout, or something of that sort.

Anyway, it will go to the Czar's bonfire along with certain foreign newspapers which speak (lyingly, of course) of certain Russian reverses in the Far East. But the customs are cleared at last, and a train takes us to Abo town. The Finnish lady heaves a sigh, but does not seem at all perturbed at the loss of her book. In the privacy of our railway carriage she confides in us. Concealed about her person are forty foreign newspapers. Apropos of this rigid censorship, I may remark that in St. Petersburg I found Miss Everett-Green's charming and innocent little book for children, *Squib and His Friends*, refused admission into Russia because, forsooth, the name of the dog with which the children played was—Czar!

Abo is the oldest town of Finland, but one seeks almost in vain for signs of antiquity. It consists almost wholly of low wooden houses, standing apart to lessen the danger of the "Red Cock," who has several times wrapped the city from end to end in devastating flame. The streets are villainously cobbled, and there are but few pretentious buildings, and these of cement. The most attractive part of the city lies around the rude, heavy Gothic cathedral. The river in front is usually crowded with the market boats, which bring the country people and their produce to the city. Beyond the river is the green observatory hill, and in the intervening space are pretty gardens with statues of Per Brahe, Finland's great governor-general, and Porthan, the father of Finnish history.

The cathedral was the cradle of Christianity in Finland. It contained the first episcopal chair, and for centuries the great ones of the land have been buried in it. I was much attracted by the painted window above the granite tomb of Catherine Mansdotter, the itinerant cherry-seller whom Eric the Fourteenth of Sweden, patron of arts and benefactor of his country, took to wife. The *mésalliance*, of course, was bitterly resented. A fellow-prince in rebuke sent this Swedish King Cophetua a gorgeous coat, in the back of which was a coarse patch of homespun. Eric returned the garment with the patch removed and replaced by a piece of the most exquisite embroidery studded with gems. Here was a royal lover indeed! But his chivalry was the cause of his downfall. Catherine was forced to live obscurely in Finland, and the king died in prison by poison. The cathedral window shows the beggar-queen bidding a sorrowful farewell to Sweden and Finland, who are represented in the guise of two fair and noble youths.

MARKET BOATS AT ABO.

The ubiquity of the Scotsman is part of the humorist's stock-in-trade. Mr. Kipling, for instance, says that

if you go to the door of the engine-room of any steamer afloat and shout "Mac," up comes the engineer. I was, therefore, not surprised to find in this quaint, remote cathedral a monumental tomb, adorned with the thistle, and inscribed, "Samveli Cokburno, Scoto, duc fortissimo." He was in the service of Sweden, and did notable deeds in the Thirty Years' War.

Abo, on the whole, proved uninteresting. The people had an air of decent poverty. All the men were top-booted, and all the women wore print dresses, and the national kerchief on their heads. Truth compels me to say that the Finnish peasant women are not distinguished for personal beauty. Their lives are hard; their tasks are heavy; the winter is long and blighting—and these conditions are not propitious for the production of Venuses. Still, the young women, despite their tip-tilted noses and broad, capacious mouths, have all the attraction which good humour and perfect health can give. The little white-haired, bare-legged, sunburnt children are altogether delightful. Most married men seem to have their quivers full of them.

The station at Abo is deserted between the arrival of the morning train from the port and the departure of the afternoon train for the capital. About three the

FINNISH BOYS.
(Notice the birch-bark shoes and baskets which the boys are offering for sale.

place wakes up; droskies rattle across the cobbled square; all sorts and conditions of Finlanders arrive, carrying the meagre and curiously fragile luggage that distinguishes the railway traveller on the Continent. Here is a decent peasant in his "blacks," with a round felt hat, and a flannel shirt laced with blue cord. Yonder is a lady student of Helsingfors University. She wears masculine headgear—a peaked cap with a white top, and a gold design in front. Of this she is rightly proud, for no student may wear this badge of distinction until he or she has passed the somewhat severe matriculation examination.

The Finlander believes in education. He will stint himself to get it. There are whole families of sons and daughters who have passed through the university, and their level of culture is distinctly high. Unhappily the Russification of Finland means the degradation of education. The bureaucrats, for whom Russia exists, hate learning and all its works. Their recipe for a happy, contented, prosperous people is to intercept the light, and thus darken the windows of the soul. Already there are galling restrictions on educational enterprise, and more may be expected shortly. To the credit of the Finlanders be it said that their great society of Friends of the School has never been more active and alert than it is in this hour of national danger.

Railway travelling in Finland is remarkably cheap and very comfortable. You can travel twenty kilometres second class for one mark ten pennia—that is, about elevenpence, or a little less than our parliamentary penny a mile. The time-table is provided with a fare ready reckoner, and the distance between station and station is clearly given. Abo is two hundred kilometres from Helsingfors, and the ready reckoner indicates that the second-class fare is nine marks seventy-five pennia, or about eight shillings. The carriages are on the American plan—large saloons with a platform at each end. These serve as a rendezvous for an occasional smoke and a coign of unrestricted observation. The engines burn wood, the only fuel of the country, and their funnels are bell-shaped. At every station along the line one sees great stacks of logs for the furnace fires.

AN OLD FINN.

The Finlander is no hustler. Like the Arab, he believes that "hurry comes from the devil, slowness from on high." His express trains run about eighteen miles an hour, including stoppages at meal times. The buffets at which refreshments may be obtained are indicated in the time-table by a crossed knife and fork. The smörgåsbord is quite ready as the train steams in, and a few moments later a busy crowd is surging round the tables, fork and plate in hand. For a mark one may *smörg* as long as the train remains in the station. Outside the buffet little maids offer quaint birch-bark baskets full of the delicious berries which grow abundantly everywhere, while peasant women strive to sell the brightly-coloured aprons which their deft fingers have embroidered during the long and dreary winter. Of course the chief ornament of every station is the big-bearded, heavily-armed Russian policeman, who watches for suspects with lynx eyes.

The railway to the capital wends its leisurely way through almost unbroken forest. Hour after hour you are in Nature's cathedral aisle, with majestic pines and glorious silver birches for columns, and the blue overarching vault of the sky for a delectable roof. Sometimes you catch, through the trees, the gleam of water—a broad, stilly lake or a rushing stream laden with logs from the far interior. It is said that wood from north Finland often takes two years to reach the coast. Sawmills driven by water-power are not infrequent.

Later on the woods fall back, and the line is skirted with fields which have been literally torn from the grip of the forest. These fields are a standing monument to the patience, industry, and indomitable perseverance of the Finlander. If the man who plants a tree is a benefactor to his country, how much more is he who transforms a wood-cumbered, stony desert into a mildly fertile field? None of the cleared spaces are large, and all are most carefully, almost pathetically, tilled.

(*To be continued.*)

THE NEW ANNOTATED CODES.

THE Code of 1904 will stand out clearly amongst the preceding ones at least upon one point—the heroic and successful attempt to make the regulations simple enough to be understood by laymen. Annotated editions have always been useful and necessary. Paradoxical as it may seem, they are this year more than ever necessary. The man in the street is going to study education. He will find an Annotated Code a veritable *vade mecum* for this purpose. In fact, all who desire to know anything about primary education must buy one. No one directly interested in education, either as teacher or manager, would think of being without an annotated edition.

The School Government Edition and Manual.—This is the twenty-third year of the publication of this edition—a fact which of itself proves at once its *raison d'être*. The editor, imbibing the spirit evinced in the Morant preface, has successfully revised and recast the whole manual, and so brought it into line with the altered conditions. "A glance at the table of contents or at the title pages to the several sections will show that while the official text of the Code and schedules forms its centre or nucleus, it contains also a great body of other authoritative information in the shape of circulars, rules, orders, minutes, official decisions, rulings, and interpretations, and collateral matter."

For various satisfactory and obvious reasons certain sections, such as the historical introduction, are suspended this year.

One special feature of the importance of this edition to the many educational officers and administrators is the principle of adhering to the original form and phraseology of the authoritative documents referred to. The editorial and general notes to the Code appear in a separate section, and are so "arranged as to be easily consulted in connection with the articles to which they relate." There is an excellent general index.

This volume contains many valuable additions, and altogether the whole comprises an encyclopædic and invaluable compilation which we are confident will merit the success it is bound to achieve.

The N.U.T. Edition.—We offer our congratulations to the editors of the popular Red Code upon this its twelfth year of issue. Whilst primarily intended for school use, it now caters for a much wider clientele. To meet the altered conditions consequent upon the setting up of local authorities and upon the simplification of the Code itself, several very important changes have been made in this edition this year. For example, the Education Acts of 1902 and 1903 are incorporated (with important notes thereon), since the duties of day school managers and teachers are largely expressed therein.

The regulations for secondary education are included, because all grades of education are now controlled by one singie authority. The whole of the notes have been revised and rearranged.

The very exhaustive general index continues to be not the least valuable feature of this volume. The various educational officials will find this an excellent reference manual on all matters pertaining to the administration of the recent Acts.

We are confident that this year will be a record one for this publication.

A NEW HISTORY AND SURVEY OF ENGLISH LITERATURE.

IT is not long ago that we had the melancholy duty of recording the death of Professor Meiklejohn, whose name is one of the best known in the educational world. Being a man profoundly versed in the true principles underlying education, he not only exerted a wide influence through his professorial lectures, but applied his educational principles to the compilation of text-books which have been of assistance to thousands. At the time of his death he was engaged on a history of English literature, but unfortunately he was never able to complete the work. The manuscript was placed in the hands of Mr. J. Cooke, M.A., of Dublin, and Mr. S. A. O. Fitzpatrick of the Irish Intermediate Education Office, and they carefully revised it and supplied the unwritten parts. The work is now published by Messrs. Meiklejohn and Holden, and we are sure it will be welcomed by students of English literature throughout the world. One is struck with the fine sense of proportion shown in assigning space to the accounts of different writers, and with the profound judgment exercised in criticising their works. The serious student will find in this book a great store of knowledge, while the one who reads for pleasure will be charmed with the gems that have been gathered from writers of all kinds, and the writer's own judgment of his subjects is supplemented by short and pointed extracts from our best literary critics.

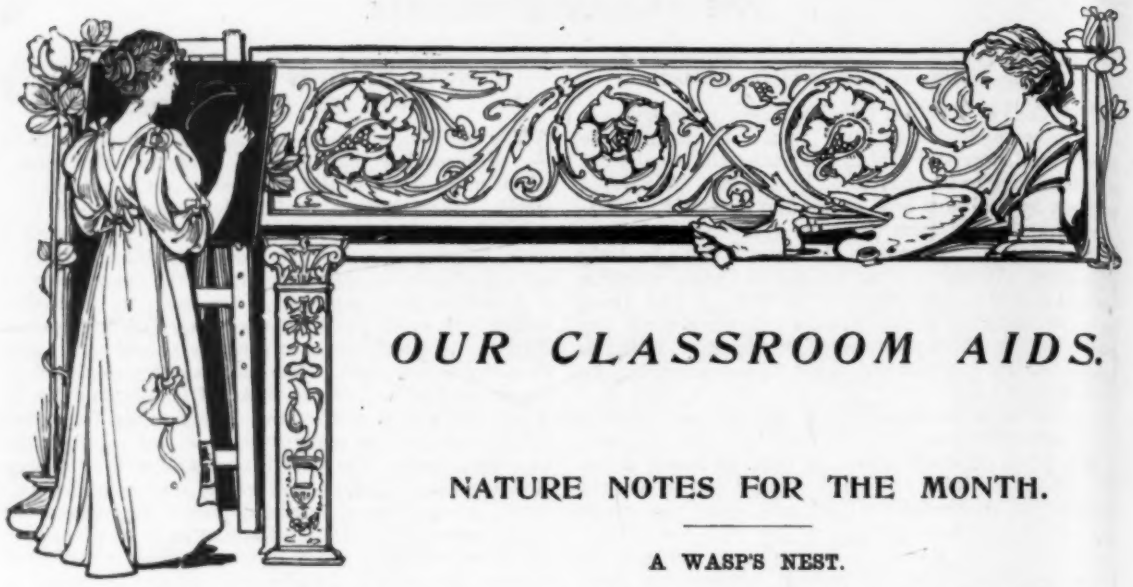
PUBLIC EDUCATION IN QUEENSLAND.—From the education report just received from the State of Queensland we glean the following particulars:—

In 1903 there was a net enrolment of 97,306 children, with an average daily attendance of 69,759. There were 1,023 schools open in the 669,520 square miles of territory. The teachers in the public schools numbered 2,378, and the total expenditure on primary education amounted to £277,060—an average cost of £3, 19s. 5d. per pupil.

There are ten grammar schools in Queensland—six for boys and four for girls. Each grammar school is governed by a board of seven trustees, appointed by the Government; and of these four are nominated by the Governor in Council, and the others by a majority of the subscribers to the funds. The trustees hold office for three years, and are eligible for re-election. They are empowered to make regulations for the filling of all vacancies that may occur in their number for the unexpired portion of the term of office, for the determination of fees to be paid by the scholars, for the salaries to be paid to the teachers, and generally for the management, good government, and discipline of the school. All such regulations are subject to the approval of the Governor in Council.

Endowment at the rate of £1,000 per annum is paid by the state to each grammar school, making a total endowment of £10,000 annually to the grammar schools. On the 31st December 1903, the aid granted by the state from the first institution of grammar schools reached a total of £292,629. Of that amount £19,593 represents special loans, and is being repaid by quarterly instalments of principal with interest.

A LEARNED HORSE.—The Berlin correspondent of the *Daily Telegraph* sends an account of a remarkable horse which was born in Russia. So wonderful is he that Dr. Studt, the Minister of Education, has visited him, and a committee of experts has been appointed to study him. The horse is a good arithmetician, working out simple sums in addition, subtraction, multiplication, and division, and giving the results by stamping his front hoof on the ground. He can count up to a hundred, recognise people by their pictures, and has an extraordinary eye for colours. He can recognise several tunes, and spell out their names with cardboard letters. He can spell words of one syllable, and knows the value of every German coin. The committee of experts has come to the conclusion that the horse does think and reason independently, and does not act as the result of any ordinary "circus" training, or from any hypnotic influence from his master.



OUR CLASSROOM AIDS.

NATURE NOTES FOR THE MONTH.

A WASP'S NEST.

How to Procure the Nest.

A FAVOURITE autumn pastime of the schoolboy is the destruction of wasps' nests. It is a fascinating recreation for the juveniles, and, moreover, one which meets with the unstinted approval of the elders, for the wasp's reputation is not of the best.

The apparatus required by the sportsmen is delightfully simple: a spade, borrowed on the understanding that it is speedily returned, and a paper squib containing a handful of cheap gunpowder—the latter also borrowed, but usually without any unnecessary formalities. Towards nightfall, when the wasps are dozing in their subterranean fortress, the lighted squib is thrust down the entrance hole, and speedily followed by a plug of turf. The noxious gases from the burning powder penetrate every nook and cranny of the nest, and work such havoc with the constitutions of the inmates that the expectant authors of the mischief are able to use the spade with safety.

After digging down a short distance, they bring to light a gray cake-shaped object, covered with loose soil. This is the coveted wasp's nest. It is speedily broken up and divided amongst the despoilers, for the combs contain numbers of plump grubs, which are excellent baits for fishing.

For a few pence the nest may be purchased entire, or the inquisitive student can procure his own specimen. In the latter case, a small quantity of cyanide of potassium has been recommended as an effectual silencer.

The Nature of its Material.

For the purpose of demonstration, the nest should be placed on a large sheet of white paper. As mentioned before, its shape roughly resembles that of a cake. Viewed from above it appears round; the sides are parallel for some distance from the bottom, but towards the top they arch over so as to form a flattened dome.

The specimen depicted, which is a fair average example, measures ten inches in diameter by six in height.

The material is presumably unknown to us at present, but we notice that the sides have a flaky appearance, as if they were built up of a number of dead leaves.

On touching the exterior it emits a crackling sound, and one of the crisp "leaves" falls upon the paper. Carefully examine the dull gray flake; pull it to pieces and note the texture, and you will come to the conclusion that it is not a leaf after all. As a matter of fact, it is a piece of paper. The process by which this flake has been manufactured is similar, on a small scale, to that employed in the production of the sheets destined for cheap newspapers; but the maker has no elaborate machinery to aid her. Her sole tools are a pair of powerful jaws and a hard broad head attached to a movable neck.

By means of her jaws she tears a number of woody fibres from an old dead tree or weather-beaten fence. The wood is then divided still finer, and masticated, together with a glutinous saliva, into the consistency of pulp. In the next operation the hard forehead is literally pressed into action, and the soft paste is spread out into sheets of the required thickness.

Taking into consideration the limited carrying capacity of the wasp, it is easy to see that each flake represents the expenditure of a great deal of energy, not only in actual construction, but also in journeys to and fro. If we look again at the flake, we notice the curved lines formed by the junction of successive deposits.

Structure.

To outward appearances the nest is a solid object, but the presence of a small entrance hole in the side plainly indicates that the interior is hollow. If a penknife is thrust downwards into the side and gently used as a lever, a large portion of the exterior falls away in the form of a thick crust, leaving the interior exposed to view.

The nest consists of two parts—an exterior shell, which extends completely round, so as to form both walls and roof; and an interior series of combs, arranged one above the other in tiers.

The wall is loosely built of a number of layers of paper, and its uses are twofold. In the first place, it holds back the surrounding earth; otherwise the vibration of passing footsteps would cause a series of small avalanches to descend on the delicate combs. Secondly, it serves to maintain an equable temperature within the nest. The papery walls are excellent non-conductors, repelling the exterior heat by day and retaining warmth by night.

The interior of the nest has aptly been compared to that of a modern edifice of the "dwelling-house" type. There are eight and sometimes ten floors, built one above the other so as to constitute stories.

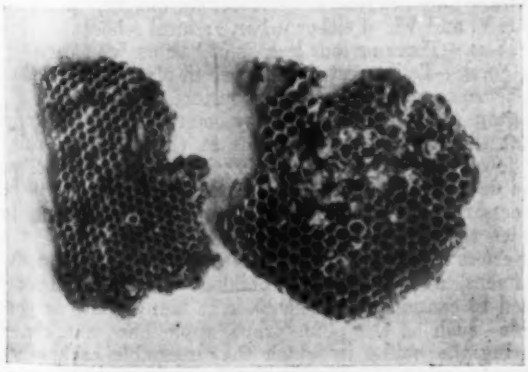
WASP'S NEST, WITH PORTION OF EXTERIOR SHELL REMOVED.

Here the resemblance ceases, however. On looking more closely into the interior, we notice that edges of the floors are not built into the surrounding walls, as in the case of the human habitation; in fact, there is a considerable space between the floors and the exterior shell. The clever wasps utilise the *roof* as the mainstay of the building, and in the following manner.

The topmost and first built platform of all is suspended from the papier-maché ceiling by stalks or pillars of the same useful material. Beneath the first platform hangs the second, attached to its predecessor in the same way; and so the whole series of combs are slung, one under the other, their combined weight being borne by the roof.

To ensure an equal distribution of weight, and also to steady the structure, the wasps anchor the first few combs to the sides of the dome by means of diagonal pillars.

Such a curious arrangement is not without its peculiar advantages. There are no foul corners in the populous city, and the limited supply of air within the nest circulates with comparative freedom. The bare walls also provide the nimble-footed inhabitants with an excellent



QUEEN NURSERIES COMPARED WITH THOSE OF THE WORKERS.
(Notice the broken cappings.)

and commodious stairway, which renders every part of the nest readily accessible. Evidently the troublesome wasp is an architect of no mean order.

At this juncture, if the nest is not required for a permanent specimen, it is advisable to strip off the outer cover and extract two combs, one from the top and another from the lower portion; otherwise the front of the nest may be tilted slightly upwards, so as to expose the under surfaces of the platforms.

Each of the hanging platforms is a collection of cells, commonly known to bee-keepers as a "comb." The cells are not punched out of slabs of solid material, as an ingenious schoolboy once suggested to the writer during the course of a lesson on "Bees." They are the units the gradual aggregation of which results in the formation of the comb.

The shape of the cells is worthy of notice. Like those designed by the bee, they are hexagonal. Round cells would necessitate a great waste of building material and space; pentagonal cells would not fit together evenly, and so on, as may be easily demonstrated by means of blackboard drawings. Square cells might possibly satisfy the theorist, but they would prove to be very uncomfortable for the young wasps. The hexagon is the only possible convenient form.

On comparing two combs—one from the lower and the other from the upper portion of the nest—a great disparity in the size of the cells is noticeable, those of the former being twice the size of those contained by the latter. The larger cells are royal nurseries, wherein the virgin queens have been reared; the smaller are the cradles of the workers, who are barely half the size of their aristocratic sisters.

A lesson on the structure of a wasp's nest would not be complete unless the combs were contrasted with those of the honey-bee.

Tabulating, we get the following:—

WASP COMB.	BEE COMB.
Composed of paper.	Composed of wax.
One layer of cells in each comb.	Two layers of cells in each comb, base to base.
Cells arranged in horizontal plane, with apertures pointing downwards.	Cells arranged in perpendicular plane, with apertures pointing sideways.
Cells used solely as nurseries.	Cells used both as nurseries and as storerooms.

The History of the Community and incidentally of the Individual.

The history of the wasp's nest is similar to that of the ant-hill. Early in spring, when the sun begins to reassert its influence, the fertilised female emerges from her winter quarters—maybe a crevice in a mossy bank, or a hole in the dilapidated thatch of an outhouse—where she has been sleeping since the previous autumn, and after performing an elaborate toilet, sets off in search of a suitable nook in which to found a colony.

A favourite site is the deserted burrow of a bank vole; but if this is not forthcoming, her ladyship is quite capable of undertaking her own mining operations.

Having become the possessor of a suitable tunnel, she proceeds to enlarge the interior, so as to form a cavern. Re-emerging once more, she then visits the neighbouring posts and dead trees for building material.

The wasp's notions of house-building are decidedly original. Instead of laying the foundations and working gradually upwards in the orthodox way, she begins by constructing the ceiling.

Quaint though her ideas may seem, she is a thoroughly

practical worker. Previous to constructing the main body of the ceiling, she forces a quantity of the building pulp into the crevices and irregularities of the cavern roof, so that the ceiling, when completed by the addition of further layers, is rooted, as it were, in the soil above. "Keying," I believe, is the technical term used by plasterers.

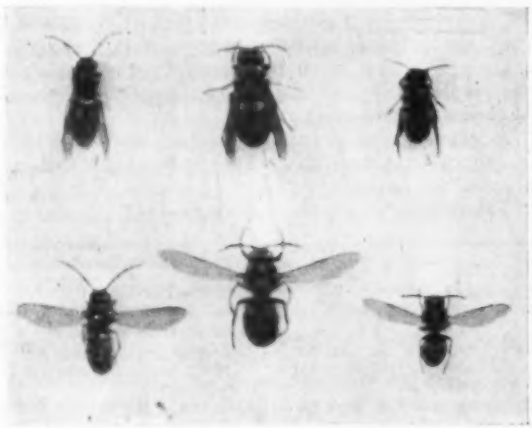
When the ceiling has been fitted to her satisfaction, she turns her attention to the construction of the first papier-maché pillar. This hangs like a stalactite from the centre of the ceiling, and at its lower extremity the first two cells are constructed.

Her menial tasks are over for the present, and she is now able to devote her energies to the more congenial duties of motherhood.

An egg is deposited in each cell. In a few days they hatch and produce tiny footless grubs or maggots (larvæ). The mother wasp carefully feeds her young on partially digested insects. They grow rapidly, and at the expiration of a fortnight are full-grown larvæ.

After spinning a silken covering over the entrances of the cells, they cast their larval skin and enter the pupal or chrysalis stage.

Meanwhile the queen constructs two more cells. When the young have completed their metamorphosis,



THE THREE TYPES OF INHABITANTS—MALE, FEMALE, AND WORKER.

they laboriously eat their way through the silken cappings, and appear as winged insects, like their mother, but smaller.

There are now three willing workers instead of two; consequently the old queen's labours are considerably lightened.

With the help of her children more cells are added, and are stocked with their complement of eggs, so that the two original cells shortly become the centre of a large group of cubicles, all containing hungry larvæ. The latter in turn arrive at maturity, and thus form another gang of workers. "Increase and multiply" is the family motto, and the recently-vacated cells are cleaned out for the reception of a fresh batch of eggs. The rapid growth of the population necessitates the construction of a second and third tier of cells, and soon the interior of the dome is filled with the hanging combs, each of which contains scores of larvæ in various stages of growth.

Each relay of new workers immediately sets to work for the good of the community. Some are self-constituted masons, constructing new cells, or assisting in the building of the downward-growing wall; others enlarge the sides of the cavern; whilst a goodly number devote their time to the care of the young, either as attendants or foragers.

By this time the inhabitants have become an intolerable nuisance to the neighbourhood, in spite of their good offices in keeping down the flies and other insects. The foragers visit the butcher, the grocer, and the fishmonger in turn; they even invade the sacred precincts of the pantry, for the purpose of sampling the fresh-made jam. Fruit-growers, too, have cause to complain, but not for long.

Towards the end of August the young males and females begin to appear, so that there are now three distinct parties of wasps in the nest—males, females, and workers.

Amongst the *débris* from our specimen nest we may perhaps find the three examples. The queen is easily recognised by her large size, but the distinction between the worker and the male is not so marked. However, when placed side by side it is easy to see that the male is by far the handsomer insect. His abdomen is slimmer and more brilliant than that of the commonplace worker; his antennæ, too, are twice as long.

Neither males nor queens take any active part in the work of the hive. The former usually occupy their time by brushing themselves, their antics irresistibly reminding one of the domestic cat.

The companion nest to the one shown in the photo was actually exhibited, together with its *living* inhabitants, for a period of three months in a well-known museum, and very interesting pets the wasps proved to be.

After fertilisation the work of the community is practically over. Workers and males gradually die off, and the first autumn frost completes the tale of the dead. The old nest falls to ruin, and in time becomes completely effaced. The sole survivors are a few young queens, who creep away into cosy nooks, to sleep until called forth by the voice of spring.

NOTES OF LESSONS ON FRUIT AND SEEDS.

Class.—These lessons are suitable for children in Standards V. and VI. of either urban or rural schools.

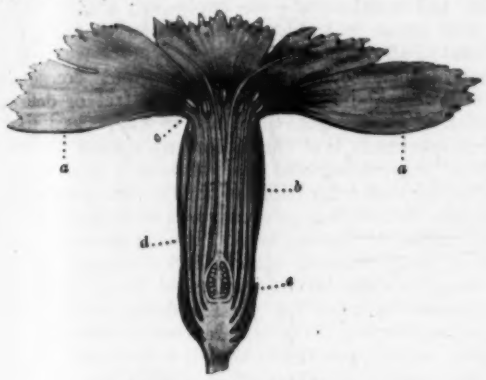
Time.—Three or four lessons of half an hour each.

Object.—To interest the children in plant life, and thus to serve as an introduction to systematic botany.

Step I. Preparation.—Every country child will know that the fruit on a tree forms at the place at which a flower has grown previously; but in order to follow the development of the fruit from the flower, it will be necessary for the children to examine a few flowers in order to become acquainted with the structure of a "perfect" flower and its divisions into calyx, corolla, stamens, and pistil. The children should be encouraged to examine for themselves as many fruits as possible—such as the plum, grape, apple, haw, nut, etc.—noting the points in which they resemble each other and the points in which they differ. In the same way, the children in rural districts should be set to ascertain for themselves, as far as possible, the various ways in which seeds are dispersed.

Step II. Presentation. *The Structure of the Flower.*—Let each child have a specimen of any flowers that are still available, such as saxifrage or red mint, which

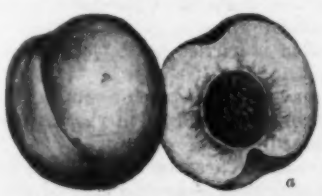
still linger in the country, or geranium or petunia, which can be obtained more readily in the towns. Starting at the stalk, we find first of all the calyx. This is usually green, and its function is to protect the flower while



SECTION FLOWER OF PINK.
a, Petal; *b*, Calyx; *c*, Anther; *d*, Style; *e*, Ovary.

in the bud. When the bud bursts open and the flower comes out, the calyx sometimes falls off as its work is finished, as we see in the case of the poppy, but generally it still remains at the base of the flower. Next to the calyx comes the corolla, consisting generally of a number of beautifully-coloured petals, the use of which will be seen later on. Inside the corolla, forming the third whorl, comes the stamen, consisting of a number of threads called filaments, each bearing at its apex a little knob called an anther. In the centre comes the fourth whorl, or pistil, consisting of a tiny bag or sac at the base, a stalk called a style, and a stigma, which may be a little knob or feathery threads. The stamen and pistil are the essential parts of the flower; for the latter contains the ovules, and the former supplies the pollen for fertilising the ovules. Let the children open the sac at the base of the pistil and examine it under a magnifying-glass, and there they will see the tiny ovules which may later become seeds. Before they can become seeds, however, it is necessary for them to be fertilised by the pollen, which is found in the anther lobes at the ends of the filaments in the stamen; and unless they are thus fertilised, nothing is formed when the flower withers.

Fertilisation.—The seed-box or ovary of the pistil may be fertilised by pollen from the anthers of the same flower or from those of another flower. It has been found that the seeds produced by a flower fertilising itself are not so good as those produced by cross-



DRUPE (PEACH).
a, Section.

fertilisation, and it is interesting to notice the methods adopted by nature to bring about the latter, and to prevent self-fertilisation. If we examine the flowers of the dog daisy or the harebell, we shall find that the anthers in each flower ripen before the pistil; so the pollen is distributed to the stigmas of other flowers before its own pistil is ripe enough for fertilisation. In the cowslip and the primrose the same result is obtained by having the stamen and pistil of different lengths, so that the stigma is placed where the pollen from its own anthers cannot fall upon it. Cross-fertilisation is effected in two ways—by insects and by wind—and it is very easy to tell from its appearance which way the flower is fertilised. Those that are fertilised by insects have brightly-coloured petals, and possess a sweet scent in order to attract the insects; and generally they have a little store of honey hidden away in such a manner that in order to obtain it the insects must push about in the flower, and in so doing gather up pollen grains on their heads and limbs, which they carry off to the next flower. Those plants whose pollen is carried by the wind have none of these allurements. The flowers are very tiny and insignificant, the calyx and corolla usually being absent altogether; but we find that they produce more pollen, as much of it gets wasted, only a very small part of the whole ever reaching a stigma.

Fruits.—After the ovules have been fertilised by the pollen, they will develop into seeds; but in some cases the process of fertilisation affects other parts of the flower as well, and a fruit is formed. Cut a plum into two halves, take out the stone, and break it, and finally we arrive at the kernel, which is the seed of the plum tree. This seed is surrounded by three coats or coverings—(1) the hard shell of the stone; (2) the sweet, juicy pulp that makes the plum so pleasant a thing to eat; (3) the

GOOSEBERRY.
a, Transverse Section.

SEEDS OF GOOSE GRASS.

thin skin enclosing this pulp. Fruits such as the cherry, the peach, the apricot, etc.—which, like the plum, have a single seed enclosed in these three coats—are known as drupes. Now cut open a grape or a gooseberry and compare it with the plum, and we find that instead of one seed there are several, and instead of three coats the outer one is there, but the two inner coats have run together and formed a pulpy mass in which the seeds are embedded. These fruits are known as berries.

True and Spurious Fruits.—If we examine a rose, we find that the stalk swells out just below the flower, forming a little hollow box in which the ovules are situated. When the ovules are fertilised and become seeds, the flower drops off, and the sides of the box swell out and thicken until they form the well-known hip. This, then, is not a true fruit, because the fleshy part of the seed is really only a thickening of the stalk. Similarly the apple and pear are not true fruits. Cut an apple transversely, and in the centre will be found five little pips or seeds, each enclosed in a separate cell, forming the core of the apple. This core is the true fruit of the apple tree, the juicy part which we eat being only the thickened stem, which has grown up around the seeds. The strawberry is another example of a spurious fruit. It is not a true berry because the seeds are on the outside instead of being embedded in the pulp; the receptacle has enlarged into a sweet, succulent knob, and has carried the seeds outside.

Dispersion of Seeds.—If the ripened seeds were merely to drop off the tree and take root in the ground below, we should have a large number of similar plants growing so close together that they would choke one another. Nature has, therefore, arranged that the seeds

FRUIT OF BALSAM.
a, Segments parting and ejecting seeds.

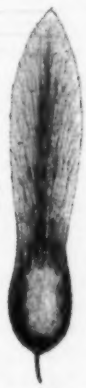
shall be dispersed so that they will take root at a distance from the parent plant, where they may have more soil and air. The various means by which the seeds are dispersed offer a very interesting field of observation. Most children have played with burs from the burdock or hound's-tongue, and know that they are covered with short, strong hooks which will readily attach themselves to a person's clothing or to the fleece of a sheep, and in this way they are carried a distance from the parent stem. Some seeds are scattered by birds. These are generally embedded in succulent coats which serve as food for the birds; then sometimes, as in the case of most berries, the seeds are so hard that if they are swallowed by the bird they pass through without being injured, while softer seeds, such as those in the hip, are provided with tiny hairs, which irritate the mouth of the bird and cause it to eject them. The wind plays an important part in the dispersion of seeds, and we find that the structure of many fruits and seeds is such as to enable them to be carried easily by the wind. The fruits of the ash, sycamore, and birch are provided with appendages which serve as wings, so that they reach the ground by a zigzag course, thus travelling a considerable distance. Instead of wings, the fruit of the dandelion is pro-

DANDELION SEED.

vided with tufts of hair, which enable it to float along in the air. In some cases the seeds themselves are provided with tufts of hair, as in the willow and poplar, while the seeds of the pine are winged. The seeds of some plants are so small that they are jerked out of the fruit as it is shaken by the wind. If we shake a ripe poppy-head, the seeds will be scattered about like pepper from a pepper-box. Some fruits—such as the box, balsam, violet, and wood-sorrel—are explosive; that is to say, the fruit opens so suddenly that the seeds are ejected and cast in all directions.

Step III. Association.—Even without considering those flowers and fruits that are imperfect or deficient in some of their parts, there are so many varieties of perfect specimens that they afford an almost boundless field for observation and discovery, and it is only by associating and comparing as many examples as possible that the children grasp the fact that these are only modifications of the one type. Thus it is easy for children to grasp that the apricot and the peach, or even the cherry, are similar in structure to the plum, though the likeness between the plum and the walnut is not so obvious; but a little examination of the walnut as it grows on the tree shows that it is a drupe, having a seed surrounded by three coats, just as the plum has. The cucumber, too, does not conform to the popular

PINE SEED.



ASH SEED.

idea of a berry; but by careful association with the gooseberry the child realises that the two structures are the same.

Step IV. Formulation.—1. The perfect flower contains—(1) calyx, generally composed of green sepals; (2) corolla, generally composed of bright-coloured petals; (3) stamens, each having a filament and anther; (4) pistil, consisting of ovary, style, and stigma.

2. No fruit is formed unless the ovary is fertilised by pollen from the anthers. Cross-fertilisation is better than self-fertilisation.

3. The pollen is carried (*a*) by the wind, (*b*) by insects.

4. Fruits may be either true or spurious. The former are formed from the ovary; in the latter some other part is developed also.

5. Seeds are distributed by animals and by the wind.

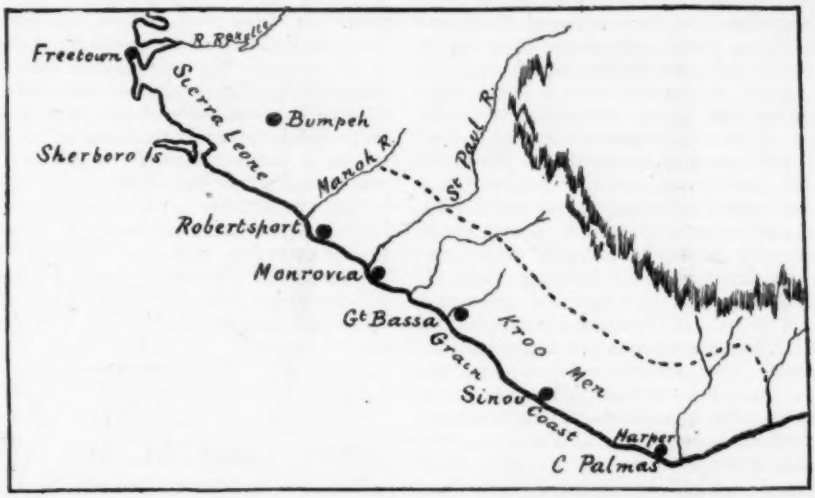
Step V. Application.—In the case of children in the country the application of these lessons will be seen in the increased interest shown in the fruit and seeds of plants and trees of the neighbourhood. Children in towns have not such opportunities of becoming acquainted with nature in this way, but the form of many fruits and some seeds can be introduced into the brush-work or drawing.

OUR ILLUSTRATED GEOGRAPHICAL NOTEBOOK.

LIBERIA.

THE negro republic of Liberia was the direct outcome of sentiment, and was entirely due to the action of American philanthropists in 1822. Freed negro slaves were allowed no political or social rights in the United States, so this settlement in West Africa was provided, to which freedmen might betake themselves to work out their destiny untrammelled by the prejudices and restrictions of white men. The experiment, now nearing a century old, has by no means fulfilled the expectations of its philanthropic founders. With Haiti, it accentuates the fact that the negro race, left to itself, is incapable of systematic and sustained progress.

The first settlement took place in 1822, and to provide for newcomers, additional land was purchased whenever necessary. The republic was not established until 1847, since which time its boundaries have been enlarged. The coast-line has a length of about 500 miles. It extends from Sierra Leone on the west to the French colony on the Ivory Coast on the east. The area of the country is about 35,000 square miles.



Physical Features and Climate.—The coast region—the Grain or Pepper Coast—is marked by mangrove swamps throughout almost its entire length, through which numerous streams in narrow basins flow to the sea. A belt of sand-dunes runs parallel with the entire coast. The St. Paul (200 miles) is the longest river. It is navigable for twenty miles for small vessels, but at its mouth is a dangerous sandbank that obstructs shipping. The coast plain has a width of about twenty miles, and then the country rises in undulating uplands, culminating in the interior in a range of hills, of which Table Mountain (1,100 feet) is the highest point.

The climate is hot and unhealthy for Europeans, but perhaps less so than that of Sierra Leone. There is a rainy season of seven months, the downpour being torrential from May to the middle of August. The dry season extends from December to April, and this period is especially trying to whites, who are particularly liable to marsh fever, as are even immigrant negroes from the United States.

Productions and Industry.—The soil is fertile, and its wealth of vegetation is remarkable in a region where profusion is the rule. Even the sand-dunes are clothed with creepers and dwarf palms. The vegetable productions include cotton, sugar, coffee, rice, indigo, ginger, cassava, banana, cocoanut, rubber, ground nuts, etc.

Cotton is indigenous, and the wild variety is largely used by the natives for their own consumption. Cotton for the European markets is but little cultivated, chiefly owing to the necessity for paid labour, especially in clearing the ground and keeping down the undergrowth. British capitalists are now seeking fresh cotton fields to counteract the manipulations of the American cotton market. Liberia is one of the regions that this movement will probably benefit.

Coffee was formerly the chief export from Liberia; but owing to the severe competition of other well-favoured regions, the Liberian product has so fallen in value as to make it sometimes not worth the trouble of harvesting the crop. The coffee is very good, and is principally used in blending with other varieties. The planters did not exercise sufficient care in collecting and drying the berries, nor did they sort them into different grades; but all, good and indifferent, were mixed together, resulting in depreciation in value. Exhausted and disease-stricken plantations in Ceylon, India, Java, and Brazil have not infrequently been renewed by the introduction of the Liberian plant.

Rubber.—The possibilities of rubber production are very considerable, for quite a score of rubber plants are known to exist. The forests are, however, practically impenetrable, and the rubber industry is in its infancy. A British company obtained a concession, and for a few years collected eighty tons per annum; but the natives exhibited so little care in collection, that the product was of unnecessarily inferior quality. A new company now proposes to preserve and properly tap the trees and vines, as in British colonies and protectorates.

The mineral resources of the hinterland are almost unknown. Iron exists in large quantities, and gold, rubies, and sapphires are believed to be present.

Commerce.—The Liberian government prepares no trading statistics; but palm oil, coffee, rubber, palm kernels, and hides are the chief exports to Great Britain, with which country the total annual trade amounts to

about £100,000. Trade is hindered by two ill-judged laws. Only Liberian subjects may possess land; foreigners may not trade in the interior or anywhere except at the official ports of entry. Trading firms hesitate to venture capital in a country where they cannot possess even the freehold of their stores and warehouses; and the prohibition is fatal to the establishment of a banking business. In the interior there is constant tribal warfare, and natives, in consequence, prefer to dispose of their produce on the French or British borders. Germany controls the greater portion of the import trade, chiefly owing to the fact that several German firms have been established in the country for many years, and have branch establishments at all the chief ports. Considering the origin of the state, it is remarkable that the United States is quite unrepresented among the trading houses. Quantities of American flour, pork, and petroleum enter Liberia, but usually *via* Liverpool or Hamburg. British coinage is largely used, but accounts are mainly kept in dollars and cents.

People, Government, etc.—There are no census returns. The Americo-Liberians number about 2,000, the natives about 1½ millions; and the Europeans in the whole of the country do not exceed seventy. The constitution of the country is slavishly modelled upon that of the United States, without those modifications which local conditions justly demand. There is a *national debt* of £100,000, contracted in England in 1871, and until recent years there were heavy arrears of interest. A great part of the revenue is obtained from head money, levied on native emigrants. Five dollars per head is charged on emigrants to Fernando Po, the Cameroons, Gold Coast, and other regions, and one dollar per head on natives engaging on board ship. The *Kroo* tribe, in particular, serve largely as deck hands and boatmen on foreign ships plying on the west coast. Every town has its Kroo quarter, occupied solely by these seafaring negroes. They are probably the most muscular and robust of all African peoples. Their character is marked by extreme honesty and a passionate love of freedom. For centuries they resisted the slave-raider, and even when captured they starved or drowned themselves rather than serve in bondage. Their attachment to their homes and families does not prevent them seeking employment for short terms in factories or on board ship. They are exceedingly loyal to their engagements, and insist on their contracts being carried out to the letter. It is claimed that this native race exerts a far more civilising influence upon the tribes of the interior than the Americo-Liberians with their exaggerated ideas of their superiority over the indigenous element. *Slavery* is declared illegal under severe penalties, but there is considerable traffic in boys, who are made over to the planters by the insolvent chiefs of the interior. The Liberians are *Protestants*. All sects are tolerated. American missions are numerous.

Towns.—Monrovia (5,000), the capital, was named in honour of James Monroe, President of the United States (1817–25). The town stands on an isthmus washed by the river Mesurado, from which Stockton Creek leads to the estuary of the river St. Paul. Seven lines of steamers call at the port and connect it with Liverpool, Hamburg, Rotterdam, Barcelona, and Marseilles. Other towns are Buchanan (5,000), Harper (3,000), and Robertsport (1,200).

CHICORY.

Chicory is the product of a plant, not unlike the dandelion, that is found in waste places throughout Europe and in Asia as far as India. It has been naturalised in the United States. The plant grows from one to three feet high; its leaves are lobed and coarsely toothed; its flowers are bright blue. Its tapering roots are sliced and dried in kilns. The resulting product, when ground, is used either as a substitute for coffee, or to mix with coffee. It is perfectly wholesome, and many people prefer the mixture to the coffee alone.

At one time the production of chicory was an English rural industry of some importance, but now the home supply amounts only to about 2,000 cwt. as compared with 80,000 cwt. imported from abroad. From 1836 to 1853 imported chicory was subject to a customs duty of 20s. per cwt.; in the latter year the duty was reduced to 4s., and in the year following was abolished altogether. In 1860 customs and excise duties were imposed, and at the present time are 12s. 1d. excise duty on the home product, and 13s. 3d. customs duty on the imported article.

In 1866–7 British chicory amounted to 21,000 cwt., yielded by 600 acres, over two-thirds of which were in the neighbourhood of York. Last year the area did not exceed 40 acres. The British grower is hampered by restrictive excise supervision. The duty is charged upon the dried root, which necessitates the process being carried out in the presence of excise officials, and in consequence the majority of farm kilns have been dismantled. The drying of the roots has thus fallen into the hands of the merchant, who purchases the roots, immediately after harvesting, at a fixed price. The farmer is then prevented reaping any advantage by a subsequent rise in prices.

Belgium supplies most of our imported chicory, for there the grower is not restricted as in England. Over 16,000 acres are under cultivation, yielding nearly 3½ million cwt. The farmer generally reaps all possible advantage by drying his own roots, and it is estimated that there are quite 2,200 kilns in Flanders and Hainault alone.

THE NEW CAPITAL OF AUSTRALIA.

DESCRIPTION OF DALGETY.

TO decide the location of its new capital has been a much longer task for Australia than making up its mind on mere fiscal issues or alien exclusion questions. After four years, however, the decision is imminent. Dalgety has been chosen by the Federal Assembly; a decision which obviates the difficulty blocking the way all last session. The Legislative Assembly then chose Tumut, the Council chose Bombala, and neither body would give way. All the sites were again placed under review of a special commission, and the discussion of their recommendations has resulted in the victory of Dalgety. Dalgety is half-way between Tumut and Bombala; it is therefore a compromise, preventing the threatened deadlock between the two Houses. It is also, roughly, midway between Sydney and Melbourne, and therefore placates the powerful interests of the two wealthiest states—New South Wales and Victoria. The prospective capital of the Commonwealth is hardly large enough even to be called a township, having a population of only a couple of hundred souls. It is right in the "back blocks," quite off the track of inter-state traffic, and consists of a few weather-board, tin-roofed

houses. It is not large enough even to exact a postal delivery from the Government. There is a post-office, but the joy of calling for one's mail in person is at present the greatest savour of life in Dalgety.

The "town" lies in the south-east angle of New South Wales, near the Victorian border, on the upper reaches of the Snowy River, a tributary of the Murray. The Snowy River flows down the spurs of Mount Kosciusko, and fed by its snows, the volume of water that flows by Dalgety beneath bordering willows is steadier than that of most Australian rivers. The fertility of the district—known as Monaro—is thus assured. The Monaro plains are more than two thousand feet above the sea level, and so Dalgety always enjoys cool nights, even in the midst of lengthy drought. Kosciusko, the highest point in the whole continent, is only forty miles distant, and the observatory established there by Mr. Clement Wragge in 1897 has frequently been snowed up, even in the summer months. The nearest railway station, Cooma, thirty miles off, is the terminus of a branch line from Goulbourn. At Goulbourn Junction the line joins the main route, which links up the four eastern capitals—Brisbane (Queensland), Sydney (New South Wales), Melbourne (Victoria), and Adelaide (South Australia). Passenger and mail traffic are alike dependent on a tri-weekly service from Cooma. Goods come by road on bullock drays—a cumbersome, tedious, and expensive method of transport.

It is difficult to foretell in what direction the main route for traffic will develop. The few miles of country between Dalgety and Cooma will easily be linked on to the railroad. In Eden, the largest town on the rugged coast south of Sydney, Dalgety possesses an outlet for sea-borne trade that is even now largely utilised. Coasting steamers plying from Sydney and Melbourne make Eden a port of call, and the harbour there is so good that Eden was itself a candidate for the coveted honour of becoming the capital. If a "bush" capital has to be created, the newly-chosen site would appear to be as good as any that could have been obtained. In pitching on so small a township the Government has at least gone on economical lines, for the vested interests to be bought out are small. From the point of view of climate and water supply, the spot could scarcely be bettered; its surroundings should inspire the loftiest patriotism, and with the establishment of Federal government in Dalgety a new era in Australian politics must surely begin.

PRACTICAL HELP IN THE ARITHMETIC LESSON.

BY GEORGE COLLAR, B.A., B.SC.,
Joint Author of "A New Arithmetic."

THERE is no part of the subject of fractions—or indeed of the whole of arithmetic—so unsatisfactorily taught as division of fractions. Only too frequently the pupils are told the mechanical rule, "Invert the divisor and multiply;" and they apply it, and manage to obtain a correct answer to the examples they have in hand. Even with candidates for pupil-teachership one finds such mechanical work as—

$$\tfrac{3}{4} \div 5 = \tfrac{3}{4} \div \tfrac{5}{1} = \tfrac{3}{4} \times \tfrac{1}{5} = \tfrac{3}{20}.$$

This shows that the pupil does not know (*a*) that to divide by 5 is to find a fifth of the thing to be divided; (*b*) that (without using the inconvenient symbol $\frac{5}{1}$) the inverse of 5 is $\frac{1}{5}$. In fact, one is tempted to ask, What does such a pupil really know?

As we have said before, there are various ways of looking at the subject of arithmetic, and it is a good plan to regard division of fractions in as many lights as possible. The teacher will be careful that one idea of the nature of the operation is grasped before another is introduced. The view that children generally take of the nature of division is that it consists of repeated subtraction. The operation of dividing 12 by 2 is to them the discovery of the number of times that 2 is contained in 12, or the number of times that 2 may be taken away from 12. Let the teacher use this as a starting-point in teaching division of fractions, and take as divisors aliquot parts—that is, fractions whose numerators are unity—and use concrete illustrations. It will be possible then at this stage to impress on the class the fact that the quotient need not be less than the dividend. This is a stumbling-block to the child, because his previous experience of division has been confined to the use of whole numbers as divisors. Take as a first example $\frac{3}{4} \div \frac{1}{4}$. Draw a line $\frac{3}{4}$ of a foot in length, and see how many times $\frac{1}{4}$ of a foot is contained in it. Remark that in fractions the denominator *names* or indicates the class of thing we are dealing with; therefore just as *one* apple is contained in *three* apples three times, so $\frac{1}{4}$ is contained in $\frac{3}{4}$ *three* times. Hence $\frac{3}{4} \div \frac{1}{4} = 3$.

Now illustrate the facts (*a*) that if a number is divided by *one* the quotient is equal to the dividend (this follows from the nature of number), (*b*) that if a number is divided by a number *greater than one*, the quotient will be *less* than the dividend, and (*c*) that if a number be divided by a number *less than one*, the quotient will be *greater* than the dividend. Suppose we have 12 cartloads of gravel in a heap. If a man takes away one cartload at a time, he must go 12 times to the heap; if he can take more than one cartload at each journey, he will go *less* than 12 times; but if he brings away less than a cartload each time—say half a load—he must go *more* than 12 times.

In dealing with division as repeated subtraction, it is best, as shown above, to deal with the division of a fraction by another which has the same denominator, but unity as a numerator. Then we may—still keeping to the same denominators—take a divisor whose numerator is a factor of the numerator of the dividend.

The next step is to divide a fraction by another whose denominator is a multiple of that of the first, both numerators being unity. For example, $\frac{1}{2} \div \frac{1}{4}$; $\frac{1}{3} \div \frac{1}{12}$.

This introduces in the simplest way the reduction to common denominators: $\frac{2}{4} \div \frac{1}{4} = 2$; $\frac{4}{12} \div \frac{1}{12} = 4$.

The converse arrangement is next adopted: $\frac{1}{4} \div \frac{1}{2}$; $\frac{1}{12} \div \frac{1}{3}$. The children can easily follow this out now, although the result is fractional: $\frac{1}{4} \div \frac{2}{4} = \frac{1}{2}$; $\frac{1}{12} \div \frac{4}{12} = \frac{1}{4}$.

These steps lead up to the general method, which is explained first by reduction to common denominators.

$$\frac{3}{7} \div \frac{2}{5} = \frac{3 \times 5}{7 \times 5} \div \frac{7 \times 2}{7 \times 5} = \frac{3 \times 5}{7 \times 2}.$$

It is necessary to point out to the children that in bringing these to a common denominator we multiply the numerator of the first fraction (as well as its denominator) by the denominator of the second, and the numerator of the second (as well as its denominator) by the denominator of the first. In this case we then have to find how many times 14 thirty-fifths are contained

in 15 thirty-fifths, and by the definition of a fraction which we adopted in the previous paper the result is $\frac{15}{14}$.

Children should work many examples in this way, until they realise that if they multiply the numerator of the first fraction by the denominator of the second, and the numerator of the second by the denominator of the first, they obtain the numerators of fractions whose denominators are the same, and whose values are those of the given fractions. These numerators are numbers of things of the same kind, and the quotient, or number of times the first contains the second, is obtained by writing the first as the numerator of a fraction and the second as its denominator.

If division of fractions be taught on these lines and by these steps, the children will have an understanding of what they are doing. Finally, they will be able to write down in one step $\frac{3}{7} \div \frac{2}{5} = \frac{15}{14}$. There is absolutely no need to make the divisor go through an acrobatic performance, and introduce a multiplication of fractions. The rule about inverting the divisor and multiplying is useless and mechanical. The fact that division by a number, whether whole or fractional, is the same as multiplication by its reciprocal may be pointed out. It will, in fact, be noticed by the children, if their attention is directed to the form of the result in which the factors appear, and it may serve as a mnemonic aid, but it needlessly complicates the operation if used as a rule.

If division is regarded as finding *how many times* one quantity is contained in another, we speak of it as *quotition*. It may also be treated as *partition*, or the sharing into a number of equal parts and determining the size or value of one part. If 12 is to be divided by 3, we have to find the value of each part or portion, such that three of them will make 12. So also, if 12 is to be divided by $\frac{1}{2}$, we have to find the value of that quantity the half of which is twelve. This view of the nature of division is not so readily grasped by children as the other, but it may be adopted in teaching.

In this case it is best to begin with whole numbers for divisors: $\frac{2}{5} \div 2 = \frac{1}{5}$; $\frac{12}{15} \div 3 = \frac{4}{15}$. In the first step the divisor should be a factor of the numerator of the dividend. Then if we remember that the denominator names the kind of thing we are dealing with, the teaching of this step may be grafted on to the children's knowledge of division of integers. Just as 2 pens divided by 2 = 1 pen, and 12 yards divided by 3 = 4 yards, so $\frac{2}{5} \div 2 = \frac{1}{5}$, and $\frac{12}{15} \div 3 = \frac{4}{15}$.

We then proceed to deal with the case in which the numerator of the dividend is not a multiple of the divisor —for example, $\frac{2}{5} \div 3$—and the children see that another way of effecting the partition will be to divide each fifth into three parts, and put in each share as many fifteenths as there were fifths in the original quantity. In this case we shall have as many parts, but each one will be a third of the original quantity: $\frac{2}{5} \div 3 = \frac{2}{15}$. This leads to the rule that a fraction is divided by a whole number if its denominator be multiplied by that number.

To prepare for the last step when we follow this course, we show that as we diminish the divisor we increase the quotient: $12 \div 4 = 3$, but $12 \div 2 = 6$.

In the second case the divisor is half that in the first case, and the quotient is twice as great. (This teaching prepares the way incidentally for "inverse proportion.") If we have to divide $\frac{2}{5}$ by $\frac{3}{4}$ instead of by 3, we are using a divisor which is only a quarter of 3; hence the quotient will be 4 times as great as that obtained by dividing $\frac{2}{5}$ by 3. We have shown in the previous step that $\frac{2}{5} \div 3 = \frac{2}{5 \times 3}$; hence $\frac{2}{5} \div \frac{3}{4} = \frac{2 \times 4}{5 \times 3} = \frac{8}{15}$.

Here also we notice that the result is obtained by multiplying the numerator of the first fraction by the denominator of the second, and the numerator of the second by the denominator of the first, and using the former as the numerator and the latter as the denominator of the quotient.

We think that the best results as regards both the practical skill acquired and the intellectual training received will be obtained by adopting the first of the above courses as the foundation of the teaching, and supplementing it by the second.

Graphic and other concrete illustrations are seldom used in teaching division of fractions, although they are employed in teaching addition and subtraction. Yet an almost endless variety of illustration will easily suggest itself to the thoughtful teacher. Let us take some based on the phrase "go into," which children are so fond of using when speaking of division. First prepare the way by an illustration involving whole numbers, and then take one of the same form involving fractions, and so follow out the grand old rule about proceeding from the known to the unknown. "How many times will a twelve-inch ruler go into a sixty-inch hole?" If we were to thrust one such ruler into a narrow horizontal hole sixty inches deep, it would all go in without reaching the end. We might use another to push this in, and then another, and a fourth and a fifth, and then the end would be reached. If an actual hole is not available, a blackboard diagram will make this plain. We can now illustrate in this manner the examples given above. "How many times will a ruler $\frac{1}{4}$ foot in length go into a hole $\frac{1}{2}$ foot in length?" Evidently twice.

"How many times will a $\frac{1}{2}$ foot ruler go into a $\frac{1}{4}$ foot hole?" The children see that it will not even go into it once, but only *half* way in. $\frac{1}{4} \div \frac{1}{2} = \frac{1}{2}$. And finally we can take examples of quite a general type. "How often will a $\frac{3}{4}$ foot ruler go into a $\frac{2}{3}$ foot hole?" The actual experiment or a diagram shows that the whole ruler will not go in, but only eight inches of it. But eight inches is $\frac{8}{9}$ of the nine-inch ruler—that is, $\frac{8}{9}$ of it will go in, or $\frac{2}{3} \div \frac{3}{4} = \frac{8}{9}$.

This, again, shows that division consists of finding (number of times or) fraction the dividend is of the divisor $\frac{2}{3} = \frac{8}{9}$ of $\frac{3}{4}$.

THE INSPECTOR'S NOTEBOOK.

BY AN INSPECTOR OF SCHOOLS.

"Master of his own School."

CONSIDERABLE discussion has been going on lately upon this topic. I do not propose to take part in it, but to give my daily experience on the point. I will begin by saying, Would that the majority of teachers were really masters of their own schools! I regret to say that my experience is that too many certificated teachers actually wait for the inspector to show them how to conduct their own schools. I rarely find a teacher who holds original and definite opinions upon schoolcraft. Often a teacher says, "What style of writing do you recommend?" I generally retort, "What style do *you* think the best?" As an inspector I would much rather inspect schools where one can see the impress of the head-teacher,

and where the teacher is capable of discussing with me the *pros* and *cons* of various methods, than meet a teacher who carries out machine-like the suggestions given.

The Cultivation of Self-Reliance. The Americans can beat us in the matter of developing the individual in self-reliance. Special pains are taken across the Atlantic to arrange for this in the instruction of all schools. The large classes in this country hinder such work. Mr. Coward, one of the members of the Moseley Commission, says: "In going through the classes, one noticed the large amount of time devoted in every lesson to teaching the children to talk about and discuss the subject of the lesson; and although perhaps less ground is covered, there is no doubt that the children do speak with a freedom and correctness which our children at home often lack." Mr. Coward found that "the composition and readiness of the children to talk and furnish their own ideas were better" in America than here.

We must be satisfied with covering less ground and obtaining as a set-off less self-consciousness. In all the subjects of the curriculum we may well afford to bear in mind this question of cultivating self-reliance.

The New Instructions re Drill. With the new official syllabus of physical exercises is issued a lengthy circular letter. I give a digest of the important points referred to.

1. It is intended that the adoption of this scheme shall be gradual.

2. The exercises are such as are common to many well-known "systems." All purely ornamental exercises are excluded.

3. A considerable variety of courses based upon the conditions laid down in the introduction, it is contemplated, will be compiled by teachers.

4. In general, the form of exercise and words of command indicated in the official syllabus should be adhered to. The differences contemplated refer to essentials.

5. No pressure should be brought to bear upon any teachers who for various reasons cannot reasonably be expected to qualify themselves for giving instruction in physical exercises. Nevertheless, the subject should be included in the curriculum.

6. The few minutes of recreative exercises several times a day are an essential part of the course. Specially qualified peripatetic instructors are recommended.

7. Suitable accommodation apart from the playground is regarded as an indispensable part of the equipment of schools for the purpose of physical exercise. "The effect of physical exercises depends in no small measure upon the regularity with which they are taken."

The above seven points are the recommendations of the Commission, and the Board of Education commend them to the consideration of the local authorities. Evening and Saturday morning classes for teachers are suggested.

One hour weekly should be devoted to formal lessons. This time may be divided into two periods of thirty minutes each, or into not more than three periods of twenty minutes each. The recreative exercises should be daily and constantly practised for two or three minutes at a time.

The Danger of Over-Inspection. I have heard here and there adverse criticisms upon the appointments of inspectors by the local authorities. Teachers have said to me, "Do you think there is need for inspection other than that done by the Government officials?" In other words, the central authority official is as much as many teachers think they can put up with. Personally, I consider an inspector to act as the representative of the local authority a necessity, and probably in most cases it will be found to be exceedingly serviceable in helping the teachers to obtain effective equipment, staff, and premises. I cannot conceive of any teacher, intent on doing his duty, who will not welcome the visits of such an official.

The county inspector, in most cases, will be an impartial expert whose knowledge of education will, whenever occasion requires, enable him to plead successfully before his committee for justice to the children and the teachers. Let me advise my readers not to be too suspicious of the new officials.

Notes on Answering. Simultaneous answering is objectionable from several points of view. The chief objection is that it is apt to deceive the teacher. The few clever children are doing all the work. For my own part, I would never allow simultaneous answering. It is too frequent in infant schools. Answers should be boldly and definitely given. They should always be in sentences. Answering out of turn is very often connived at by teachers; and another fault is the habit many children have of giving unasked the answers *sotto voce*.

Inspector's "Notebook" Query Column.

Letters should be addressed, "Inspector," care of the Editor, 35 Paternoster Row. In cases of urgency replies can be sent by post if two stamps are enclosed with an addressed envelope.

De Serf asks, "Do you think it possible to get up French in fourteen months for London Matriculation? I know no French except what any intelligent person might know who had not learnt it."

Answer.—Yes, providing you can give about two and a half to three hours a day to the subject, and are a quick student. If you have all the other work for this examination as well to do, I should say "No."

"*B*" has obtained the L.L.A., and is a secondary teacher. She wishes to know what position she could take in an elementary school, and at what salary.

Answer.—You would rank as an uncertificated teacher if your L.L.A. certificate includes a pass in at least three subjects, of which one must have been English, one higher arithmetic, and one an ancient or modern foreign language.

Music.—Is there now an examination in practical music at the Certificate Examination?

Answer.—Yes. It was held for the first time at the last examination. At the colleges there has previously been some sort of practical examination—usually a song.

University of St. Andrews: L.L.A. Examination, 1904.—The results of this examination, which was held at numerous centres in Great Britain and Ireland, France, Germany, Belgium, Switzerland, Malta, Natal, Queensland, and the United States of America, on the 31st of May and 1st and 2nd June, have just been issued by the university, from which it appears that 960 candidates entered for examination, as compared with 902 candidates in 1903. Three hundred and six candidates entered this year for the first time, as compared with 231 in 1903; and from the commencement of the scheme, in 1877, 6,221 candidates in all have been entered for examination. One hundred and one candidates have this year completed the requisite number of subjects, and will receive the L.L.A. diploma of the university.

The Practical Infant-School Teacher.

A SCHOOL JOURNEY IN THE PEAK DISTRICT.

BY CATHERINE I. DODD.

POVERTY of experience, poverty of impression in childhood, dwarf mental power in later life. As the loss or defect of a sense organ limits the intelligence of an individual, so does a monotonous and meagre environment. A blind Raphael would have made no pictures, and a deaf Mozart no music, for lack of experience of colours, forms, and sounds. The formal attainments gained in the classroom fail to produce vigorous personalities, because necessary experiences and vivid impressions are lacking in formal teaching. Vital teaching alone touches the important things in child nature, and nourishes sub-conscious life; for the words children speak out of text-books and the work they produce under direction never represent the real self, merely the ripple on the top, so to speak. Below is the self—a sea fathomless and mysterious; and to educate truly, one must get at the soul of the child and arouse his imagination, initiative, and insight.

The crowded classroom of a town school allows little scope for the full development of a human being. "Lead your child out into nature; teach him on the hill-tops and in the valleys. There he will listen better, and the sense of freedom will give him more strength to overcome difficulties. But in these hours of freedom let him be taught by nature rather than by you. Should a bird sing, or an insect hum on a leaf, at once stop your talk. Bird and insect are teaching him. You may be silent."

So wrote Pestalozzi in 1774, in the journal recording his little son's education.

Rousseau, who saw, and forced an unwilling world to see, the folly of dealing with words alone in teaching children, writes in 1762: "You want to teach that child geography, and you seek for globes, spheres, maps, and hosts of apparatus. What is the good of these things? Why do you not begin by showing him the object itself, so that he knows at least what you are speaking to him about?"

Systematic outdoor instruction is not common in England, partly because this kind of teaching does not yield quick and fruitful returns for an examination paper. Examination results are, as Froebel pointed out long ago, "mere matters of memory and mechanical dexterity;" but the kind of instruction "that educates and develops the scholar as man" has wider issues.

Childhood demands freedom of sensation, contact with actual things, plenty of experiences, and scope for self-activity and self-expression.

The business of the teacher is to arrange the child's environment, to provide the circumstances so that sensations may pour in upon him, and to leave him alone to his observations and experiences as far as possible; for it is what the child sees and thinks about things that are important for his development. The teacher's observations and opinions are comparatively unimportant.

The teachings of Rousseau and Pestalozzi have borne better fruit in Germany, Switzerland, Hungary, and Austria than in our own country. School excursions, school journeys, school gardens, form a definite part of school instruction in all classes. Training students, too, are required to take part in outdoor instruction as a part of their preparation for the teaching profession.

The children of the Brunswick Street Practising School, Manchester, regard the school journey as the great event of the school year. This school is in connection with the Day Training College for Women of the Victoria University of Manchester.

Three school journeys of several days' duration have been successfully undertaken during the last two and a half years, and the object of this paper is to describe the school journey which took place at the end of June in 1904. A considerable part of the school teaching is done by college students, chiefly those of the third year, and the time chosen for the great journey of the year is at the end of June, when the university examinations are over, and students can go forth with a light heart. All through the year the school journey is kept well in mind, and allusions and illustrations are constantly cited from places of historical, geographical, or geological interest to be visited, or which some of the children have seen the previous year; and Haddon Hall, Bakewell Church, Peveril Castle, the Roman camp at Melandra, are freely used as illustrations in the history and architectural lessons.

"You will *see* a watershed if you go up the valley from William Clough," said a little girl to a younger boy as she proceeded to draw a diagram on the blackboard from her experience of the Peak district. These children live in a great town, but they are as familiar with the things of the country as any country-bred child. In spring the specimen table is always loaded with flowers, twigs, buds, and grasses. And every day after prayers the new specimens are examined, named, and entered on the nature calendar. As I write on July 4th, I quote from the day's entry: Hop, clover, comfrey, yarrow, fool's parsley, ragwort, yellow meadow vetchling, wild fumitory, honeysuckle, ragged robin, lesser willow-herb, goosefoot, speedwell, oats, Quaker's grass, wild guelder-rose, lesser stitchwort.

The little freshwater aquarium, too, is teeming with life, and a dozen baby frogs have gaily emerged from

the clumsy stage of the ripe tadpole during the last two days, and sit on the floating island, regarding the schoolroom with that wide-eyed gaze peculiar to all young things newly launched into the world.

The students in charge of the nature study are greatly indebted to the professor of botany, who never grudges time and trouble to help to keep the specimen table well supplied, and to give students and children accurate information. It is the children's pride to make collections for themselves on the school journey, and so they ransack hedgerow, meadow, and moorland for treasures. One little girl of nine collected sixty-two specimens this year, all of which she verified and entered the names in her notebook. The rest of her class collected from thirty to fifty specimens.

The children's minds being prepared for the school journey, were eager and expectant; and the students, fresh from the examination room, were in excellent spirits. Our party of sixty started from the London Road Station for Hayfield early in the morning, and during the journey the children noted the signals, devices for finding the rate the train was travelling, the rise and fall of the land; and on consulting the map they discovered that they passed three counties. On arriving at the station all the luggage was collected by two students and taken to Park Hall, while the children were drawn up on a convenient bridge to hear a lesson on the railway. The student dealt skilfully with her subject, collecting the children's observations on the journey and supplementing them. Children and students then fell into line, and followed the leader to the moors. A halt was called at a stone quarry, which was inspected, and the working of a crane observed. A wind pump next attracted the children's attention, and they watched it while an intelligent student explained its use.

The beacon on the top of Lantern Pike demanded much explanation, and the method of conveying news from one district to another was discussed. The Kinder range of hills was pointed out and the heights named.

Higher up another halt was called, and the drawing mistress calling together the elder children gave them some elementary ideas on picture composition, and encouraged them to sketch the outline of the hills, a wall, and the well-marked valley below. Some excellent attempts were produced by the children.

In the meantime the younger children were collecting flowers and grasses, under the supervision of two botanical students, entering the names in their notebooks, and pressing specimens for their nature books. This part of the work was done with vigour and enjoyment. Then we climbed higher up over the moors, and obtained a magnificent view of the valley below, and, as one small girl remarked, "the higher you go up, the nicer it is to look down." Hungry and hot, we halted at a mountain stream and ate our lunch, after which the children carefully buried the paper and orange peel, and found many treasures: a blue butterfly, yellow bumble bees hovering over the wild thyme, an ants' nest, "a black slug as big as a little lump of coal," as a small boy said, a bird's skeleton, and fern fronds tightly curled—treasures inestimable to town-bred children. An imaginative little girl invented stories of ant life, and told us why bees loved the thyme, and why the fern fronds were curled so tightly, and imaginative elders helped her out with her stories. But the whistle of the leader rudely checked our imaginations, and we were required to listen to an instructive account of the origin of the valley and the work of a watershed. Then we went on until we reached the point at the bottom of the Clough where the stream broadens out, and here we recklessly discarded shoes and stockings, and paddled happily—even the oldest of us. Then a research party was made to discover the source of a little tributary tumbling joyously down the mountain side, and after a hard climb the source was found, with a large yellow frog guarding it, "like a dragon in a fairy tale," as the imaginative little girl remarked.

On our return there were lessons on waterfalls and on the action of water, given at convenient spots with the natural objects before us; and later we sat on the moors and sang old English songs, and told old English stories of brave knights and adventures. It was nearly six o'clock when the whole party, hungry, happy, and dusty, arrived at Park Hall; and after the bedrooms were fixed and everybody was washed, we sat down to a satisfactory meal. The children spent an hour afterwards in writing postcards home and entering up their notes and maps. After they were in bed, the students and mistress of method held a conference on the day's proceedings, and to arrange details for the next day.

The children had breakfast at eight o'clock next morning, and at 8.30 the whole party started. At the moors they separated—the junior group branching off in another direction, and the senior division making for Castleton.

The meandering stream fascinated the younger children, and they watched with keen delight the speckled trout occasionally jumping up to catch the flies brooding over the sunny waters. The waving of the grass was commented on by the children and the teachers, and wayside and hedgerow specimens were eagerly sought. The "cuckoo-spit" occasioned great excitement among the children, who had never seen the like before. So a halt was called at a convenient spot on the upland, and the mistress of the school gave an interesting lesson on "cuckoo-spit." The uses of the froth surrounding the insect were discussed, and stories were told of the little creature itself. A botany talk followed, and new specimens were eagerly shown by the children to students and teachers.

The hills were next studied in detail from a different point of view, and a map of yesterday's walk was drawn in the wayside sand. The geography lessons of yesterday were recapitulated and supplemented with fresh illustrations, and the relation of the mountain system which lay before us to the mountain system of England was made clear, and the children understood that the Peak was not one point, as marked on the map, but the series of hills they saw around them.

A further lesson on Kinder Downfall followed, and numerous questions as to the scarcity of water were asked and answered. The children were so interested that they asked permission to sketch Kinderscout and the Downfall, and some creditable attempts were made.

At twelve o'clock the mistress of the school gave an interesting lesson on the points of the compass and the position of the sun. Many questions were asked both by children and students. Later the teacher showed a method of finding the cardinal points by means of the hands of a watch—a method unknown to many of the students.

Lunch followed on the hillside, and pails of water were brought from a farmhouse, as there was no mountain stream at hand to supply drinking water.

After lunch the children roamed at will, and found treasures. Newts and efts in a pond were a source of

great delight, and the bones of a "Roman cow," as a small girl emphatically asserted, "because they were found on the old Roman road," were triumphantly carried off to enrich the school museum.

The continuation of the compass lesson was resumed at 2.30, the shadow shown at that time being compared with the shadow thrown at twelve o'clock; and again at 4.30 observations were made and comparisons of shadows discussed. A small boy of seven stood in the proper direction with his arms stretched out to the east and west, whilst the children carefully measured the length of his shadow at the various times.

Children's observations on animals and birds were collected and discussed—eight different animals and six kinds of birds being noticed in a single half-hour.

A sketching lesson followed, some of the elder children sketching the hills, and some a tree and a cottage, while the younger ones wove baskets from the rushes found in the stream. A plover was seen circling round on the homeward march; which called for a discussion on the habits of plovers. The Peep o' Day was passed, and from the new main road to Hayfield the children were able to point out Eccles Pike, Chinley Churn, Cracken Edge, and other places of interest. Park Hall was reached at six o'clock, and supper was over before the Castleton party arrived full of historical lore, and stories of Peveril of the Peak.

On the third day the whole party proceeded in another direction to the moors, and a halt was called high up among the heather under the blue heavens. For an hour or so everybody did as they pleased, and some of the children drew, some searched for more specimens, some rolled down the springy slopes. The imaginative element had full scope, and students and children invented fairy tales and romantic stories about what might have happened on these hills long, long ago, "so long that no dates can be given," as a lively narrator of thirteen said, one who was particularly well informed on the dates of the stories of Peveril Castle.

We were abruptly summoned from our romance stories by the whistle, which announced a lesson, and a capital lesson was given on a weathercock, and this useful instrument was made and its records taken on the spot—a hat pin, a paper arrow, and a walking stick being the simple factors in the construction of a weathercock on the moors.

Poetry was then recited, particularly Spenser's *Faery Queen*, by one who had learned hundreds of lines of this poem in childhood, and the children were incited to do likewise. "If we only had time, we would have acted *As You Like It*," one of the top class remarked. But the river below looked tempting, and the boys were impatient; so we all scrambled down the hillside and paddled in the stream, and acted Robinson Crusoe instead; while the children who were not allowed to paddle tied a crooked pin to a piece of cotton and fished peacefully, with the imperturbable gravity of the fisher who fishes for hours and catches nothing. One of the elders beguiled them, however, with stories of fishing adventures on the sea, and they were happy and good enough. "We might have caught trout if the rest had not paddled," was their comforting comment as the cotton and pin were put away. At 12.30 we walked home for midday dinner. It was a wonderful walk, full of discoveries. We saw rabbits and one squirrel; we found striped snail shells, and a tiny bird dropped from the nest; and we recounted the names of all the flowers and trees we passed. "I'd rather have a school journey than a pantomime any day," was the comment of the small boy of seven as we turned in at the Hall gates.

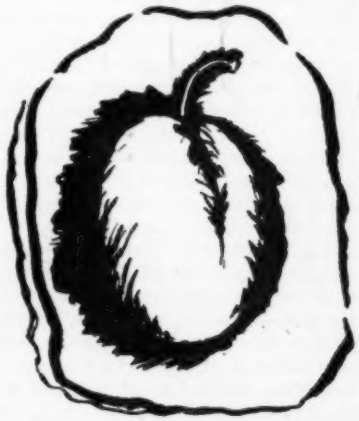
After dinner were a cricket match, school sports, and tea on the lawn; and at 5.45 we were all speeding back to Manchester, refreshed and happy, with minds stored with experiences and impressions never to fade.

The cost of the three days, including railway fare, was 9s. for each child and 10s. 6d. for each student.

EXPLANATIONS AND SUGGESTIONS FOR CARRYING OUT THE OCCUPATIONS IN CONNECTION WITH THE ILLUSTRATED CORRELATED SCHEME OF WORK FOR AN INFANTS' SCHOOL.

October, Week I.

Clay Modelling.—The plum. This is best made from the ball. A slab upon which to place it is an improvement, and it affords good practice for the children to make it. Too much time should not be spent on the slab, however, but the children encouraged to work quickly. In modelling the plum, care should be taken to insert the stalk, and the children shown how seriously the realistic look of the fruit is affected by clumsy work. A depression should be made at the top with



Week I.—Clay Modelling: Plum.

the thumb, and all edges carefully rounded off by working the fingers round the depression. A small hole should then be made, and the stalk (a small piece of clay rolled out thin and slightly thickened at the farther end) inserted, and the clay around smoothed well. With the rounded end of a modelling-knife make the depression lengthwise, as shown in the illustration.

Brush Painting.—Here the colour is important. Cobalt with crimson lake makes a good purple for the plum, sap green for the leaves, and vandyke brown for the branch and stems. If three colours are impossible, I should advise omitting the painting of the leaves.

Begin with the branch. Show the children that it is not absolutely straight, and then proceed to demonstrate the painting of it on the blackboard. When painting the plum, show the advantage of leaving some white streaks—it gives an idea of light and shade.

WEEK I.—BRUSH PAINTING: PLUM.

WEEK I.—BLACKBOARD DRAWING: PLUM.

WEEK I.—PAPER CUTTING: PLUM.

WEEK I.—CRAYON WORK: PLUM AND LEAF.

WEEK I.—STICK LAYING: JAM POT.

Paper Cutting.—This should first be drawn, and then cut out with the scissors.

It is unnecessary to say anything about the blackboard drawing, as it is assumed that every teacher would, before setting the class to attempt it, lead them to notice the special characteristics relative to the growth of the plum, and so forth.

Crayon Work.—Trace this copy on a piece of paper, and then transfer sufficient for the class. Three colours —red or purple, brown, and green—will be required. The children fill in.

Stick Laying.—This speaks for itself. The teacher will, of course, have some conversation about the fruits made into jam.

October, Week II.

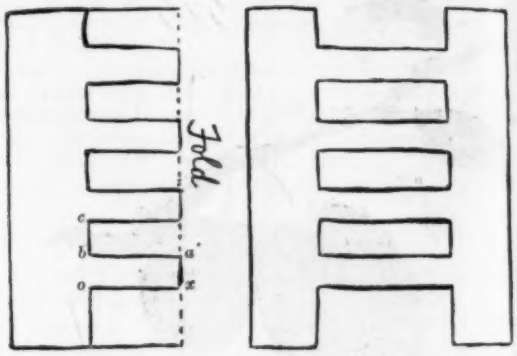
Clay Modelling.—The apple. This is modelled from the ball. The points to notice are—the insertion of the stalk, the making of the dried calyx at the other end, and the depressions at both sides of the apple. Be careful to have several apples, so that they may be passed round and these points specially noticed. To make the calyx, take a very small piece of clay, roll into a ball, and press between finger and thumb; divide into five points carefully, and place this on the modelled apple. With a blunt tool make the lines as in illustration. The stalk is inserted similarly to that of the plum, only it is, of course, thicker.

Brush Painting.—The colours required are red and green. Vermilion with a dash of crimson lake answers well for the red, and thin sap green for the other. For the apple lay on a thin wash of green all over. Avoid

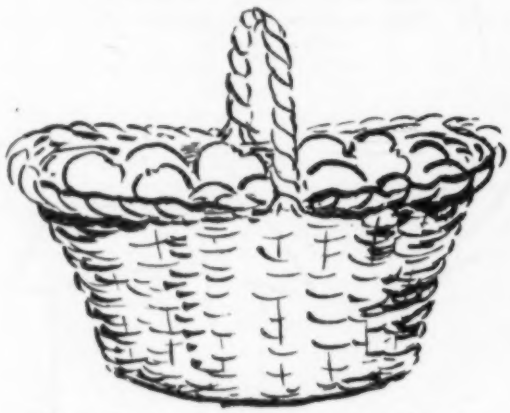
WEEK II.—CLAY MODELLING: APPLE.

outlining for the shape of the apple. Before this is quite dry lay over it some red on one side. Leave some spots uncovered, as shown in the illustration. Paint the leaf and stalk green, leaving the mid vein of the leaf uncoloured.

WEEK II.—BRUSH PAINTING: APPLE.



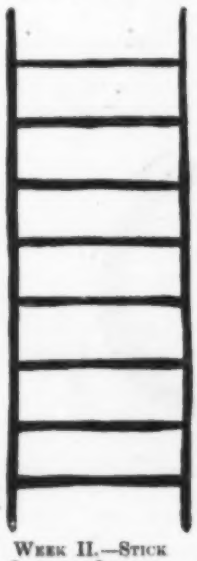
WEEK II.—PAPER CUTTING: LADDER.



WEEK II.—CRAYON WORK: BASKET OF APPLES.

WEEK II.—BLACKBOARD DRAWING: APPLE.

Paper Cutting.—As this object is perfectly symmetrical, it may be cut from a piece of paper folded in half. The fold of the paper will then be in the centre of the rungs. Begin to cut at the point marked *x*. Cut to *o*, and turn at right angles, and cut the piece out. Then begin at *a*, but this time, when *b* is reached, turn at right angles upwards to *c*, and cut each rung in the same way, beginning each time at the folded side.



WEEK II.—STICK LAYING: LADDER.

Crayon Work.—This object will again be done by means of the copier. The children will simply fill in. Brown for the basket and red and green for the apples will be suitable colours. If a simpler object is preferred, the basket without the apples will do nicely.

Stick Laying.—Two long sticks for the sides of the ladder and five smaller ones for the rung will be sufficient, though, of course, should time be no object, a further number of rungs to the ladder may be added.

October, Week III.

Clay Modelling.—Hips. A slab upon which to place this model may be considered indispensable. It will be best to model first the fruit, and then to these attach the stem, as the latter being required thin, if not done quickly is apt to break. Notice that the stem is not

WEEK III.—CLAY MODELLING: HIPS.

WEEK III.—BRUSH PAINTING: HIPS AND HAWS.

WEEK III.—BLACKBOARD DRAWING: HIPS AND HAWS.

WEEK III.—CRAYON WORK: HIPS.

WEEK III.—PAPER CUTTING: ROSE LEAF.

WEEK III.—STICK LAYING: BASKET.

absolutely straight. Model the fruit from small balls. The tops will be found the most difficult parts, but should be accomplished well with care. Work up towards the top with the fingers, and then slightly flatten and roughen.

Brush Painting.—If desired, this study may be simplified by omitting the haws. Colour required is vermilion to which some crimson lake has been added. The berries may be painted with two brush strokes, leaving a dash of white for effect. Add the stalks in brown, and, when the berries are dry, a touch of vandyke brown at the tops.

Paper Cutting.—This is intended to be drawn first and then cut out. It may, of course, be simplified by taking it on a rather larger scale.

Blackboard Drawing.—This will not present much difficulty. If possible, it would be better attempted after the painting had been done.

Crayon Work.—This is intended for filling in, the design having first been transferred to paper by means of a copier. Red and green are the colours required, green answering for the stalks as well as the leaves.

October, Week IV.

Clay Modelling.—The acorn. The illustration shows this on a somewhat larger scale than is necessary in carrying it out. Of course, it is assumed that actual acorns would be supplied as far as possible; but if they are not obtainable in sufficient numbers, I should recommend the teacher to make a model herself on a large scale, so that the children may look at the natural characteristics of growth. Model the acorn first, and then the cup, and specially note the direction of the stalk. The cup may be roughened by using a modelling tool or stick. Note the little point at the top of the acorn.

Brush Painting.—These should be easily done in two strokes of the brush, care being taken to leave some white streaks or patches towards the top. Do not omit the characteristic fine point at the top of the acorn. Dot over the cup to imitate the rough appearance. The colour recommended is rather thin sepia. Of course, if desired, the acorn may be painted green and the cup brown; and this is sometimes seen in nature. The acorn and cups are usually the same colour, either brown or green.

Blackboard Drawing.—An opportunity occurs here for giving practice in some good curves. It will be best to draw this on a rather large scale, first looking well at the object, and noting special characteristics, and, if possible, drawing entirely from it.

WEEK IV.—CLAY MODELLING: ACORN.

WEEK IV.—BRUSH PAINTING: ACORNS.

WEEK IV.—PAPER CUTTING: OAK LEAF.

WEEK IV.—BLACKBOARD DRAWING: ACORN.

WEEK IV.—CRAYON WORK: ACORNS ON SPRAY.

WEEK IV.—STICK LAYING: OAK TREE.

Paper Cutting.—This is intended to be drawn first, and then cut out with the scissors. The rounded outline of the leaf affords an excellent exercise in the use of the scissors, and helps very considerably in impressing the particular shape on the child's mind.

Stick Laying.—Sticks of three lengths are required for this exercise, the object being rather to show the spreading nature of the branches of the oak tree.

Crayon Work.—This design should be reproduced on papers by means of a copier, and one given to each child. Some differentiation between the acorn and cup will be required. I should recommend brown for the stems, green for the cups, brown for the acorns. This exercise requires some careful work. It will be advisable for the teacher to have a *facsimile* on a rather larger scale on the blackboard.

THE Oxford University Press is about to publish a little book by Mrs. M. E. Boole, called *The Preparation of the Child for Science*, in which she has utilised on behalf of little children the life-work of many great men now almost forgotten, especially Thomas Wedgwood, Charles Babbage, and the late Dr. Wiltshire.

SINGING IN INFANT SCHOOLS.

BY W. G. M'NAUGHT.

PART II.

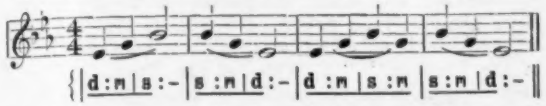
Practical Work—Voice Exercises.

EXERCISES designed to secure sweet and easily-produced tone should be as simple as possible. The *Doh* chord (d m s–s m d–d m s d¹–d¹ s m d), scraps of the scale, or a little tune, will answer the purpose. Obviously it is the manner of performance, not the matter used, that constitutes the utility of a good voice exercise.

The *Doh* chord is an easy, melodious tune. At first it should be used in its short form (d m s without the high d¹). Pattern it as well as possible, or get some child with a good voice to do so. Use the syllable *koo* and sometimes *oo*. The vowel *aa* is also good, but it must be patterned to the children and sung by them with great care. Children whose habit of speech is harsh are apt in singing to adopt a squeezed-out, penetrating *aa*, produced at the back of the throat. They must be

persuaded to sing quite gently, with slightly rounded lips, and to try to make the sound float out of their mouths. In all such exercises very little tone should be expected. The teacher who continually urges little children to "sing out" cannot produce good results.

The following rhythmic arrangement of the *Doh* chord will serve for a first exercise :—



Begin, as shown, in the key of E flat, and afterwards use higher keys, up to G and A flat, as the children develop capacity to sing smoothly. Later, use the complete chord as follows :—

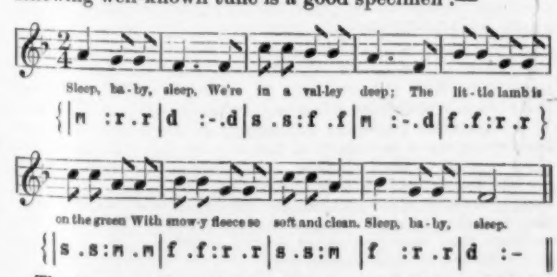
Scraps of the scale, sung from pattern, using the solfa syllables or the syllables *koo, oo,* or *aa*, are not only useful as voice exercises, but are serviceable in teaching the scale with a view to sight singing. This co-ordination of voice training and sight singing can be made highly educational and extremely interesting. The "mental effects" of the scale degrees should be continually demonstrated (not merely described), and the tonic solfa hand-signs should be used by the teacher. As familiarity with the "scraps" is gained, children will easily tell one from another by ear. The following scraps are suggested, but, of course, many others can be made :—

Key C, D, or E flat.

(1.) d m s	(4.) s t d'
(2.) s m d	(5.) s f m
(3.) m r d	(6.) s l s

It will be noted that in the above every degree of the scale occurs in its most commonly used connection.

Another form of voice exercise is to use a simple tune well known to the children. This is at once the pleasantest and, if adroitly used, the best form. Children seldom tire of singing a nice, simple tune, so it is easy to coax them to want to sing such a tune when perhaps an exercise would repel. Any well-constructed tune will answer the purpose, but it is best at first to choose one with a rather small range—say not more than a sixth—in order that it may be transposed to many keys without calling for very high or very low pitches. The following well-known tune is a good specimen :—

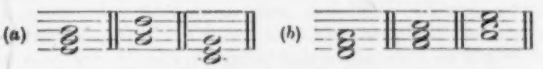

Sleep, ba-by, sleep. We're in a val-ley deep; The lit-tle lamb is
m :r.r | d :-.d | s .s:f .f | m :-.d | f .f:r .r
on the green With snow-y fleece so soft and clean. Sleep, ba-by, sleep.
s .s:m .m | f .f:r .r | s .s:m | f :r .r | d :-

The tune, when thoroughly memorised, should be sung to *koo, oo,* and *aa* in, say, key F, then F sharp, then G. The keys of A flat and A can be used later if the children can sing without strain. All the singing should be soft (not always *very* soft, for to sing thus continually may induce indolence and bad intonation) and sweet. If this kind of practice is persevered with, it will be gratifying to notice how one by one singers who used to sing harshly will gradually drift into making their voices blend pleasantly with the others. When once the practice of voice-quality exercises has been instituted in an infant class, they need not take up much time. From five to ten minutes a day properly employed will be found sufficient.

Only the vowels *oo* and *aa* are suggested in the foregoing exercises. These two vowels are generally useful for establishing good mouth habits, and for educating the ear to relish smoothness. But other vowels may with advantage be used. *Ee* is a good exercise, but extreme care must be given to its production. It should be very smooth and beautiful, the lips being rounded and the roof of the mouth kept up.

Sight Singing.

Sight singing in an infant class should be looked for as a by-product of teaching that has other definite objectives (voice delivery, good tune, sweet tone, pretty rhythm, the memorising of attractive songs, etc.) rather than as an indispensable section of the work. Pure ear singing, if good, is at least a substantial basis for after training in sight singing—it leaves nothing to undo. It is certainly an infinitely better basis than harsh, unrhythmic singing plus "skill" to sing execrably out of tune at first sight. But there is no reason why the elements of sight singing should not be inculcated side by side with the teaching of the topics enumerated above. The greatest thing in music—the scale—the appreciation of which as a set of relations is a natural instinct, can be pleasantly and incisively taught in the course of the practice of voice exercises and tunes. The tunes can be made to teach the scale, and the scale to teach the tunes. The patterning of tunes to the tonic solfa syllables, line by line, whilst pointing on a modulator, the frequent direction of attention to the peculiar effect of this or that degree of the scale, the use of the hand-signs for the scale, the occasional singing of simple exercises written on the blackboard, will build up the habit of associating name and effect. The staff notation can also be introduced in interesting ways, at least so far as to accustom the children to see that the *Doh* chord (**d m s**) can be shown on three lines or in three spaces, and the staff can soon be used as a modulator.



It is not wise to confine the practice to one "key." The principle of reckoning from a space-doh or a line-doh is the important one to establish. Signatures, clefs, names of lines and spaces (as A, B, C, etc.) can of course be left for the present.

Then as to rhythm. The idea of a pulse can be thoroughly well taught. Every child can march or tap to a tune, and in this way understand the idea of pulsation.

Next, the broad accents or pulses which result in the formation of measures or bars can be attractively demonstrated. Children will with delight tap regularly in twos or threes, and thus show the two important ways of accenting pulses. Whether notation should be employed in connection with such teaching is doubtful.

Such progress must depend upon the interest and intelligence of a class. The teacher must discover the right psychologic moment for such instruction.

Choice of Music.

Much poor stuff is offered for use in infant classes. It is too often assumed that so long as a string of scale sounds jingles along in some regular metrical rhythm and fits the words to be sung there is nothing more needed. One can only hope that the good taste of the teacher will assert itself in this matter. It is not necessary to plead for the use of fine music in the infant class; but at least what is used should have some element of rhythmic or melodic grace that will educate the taste of the children. It may be hoped that music-loving teachers will not go to the other extreme and teach songs that are beyond the compass and comprehension of their pupils. Part singing should not be attempted, because it tends to lead little children to sing out of tune. Even simple rounds are dangerous for the same reason. Unison or action songs and game songs should form the main part of the *répertoire* of an infant class. It is because children generally throw themselves with so much ardour into the dramatic performance of such music that their vocalisation should be vigilantly observed by the teacher. It is often very difficult to judge how much to repress, because over-repression paralyses the whole performance. In cases where voices are being obviously worn by exertion the teacher should at all costs to the game give children complete rest.

The pole-star of the infant-class teacher must ever be sweet tone, clear enunciation, good tune, natural expression, and the establishment of a love for music.

OUR SUPPLEMENT.

PICTURES AS AN AID TO WRITING ENGLISH.

WITH this number of the *Practical Teacher* we present a supplement, consisting of four sets of pictures intended to serve as subjects of composition exercises by children. These four sets will furnish four good lessons to any class above the second. The teacher who has not yet utilised pictures as an aid to writing English should experiment with those now presented to him. We venture to think that he will be surprised and delighted with the result. The children will enjoy the lesson; its novelty will engage their attention; they will set about the work with zest; they will all produce a complete something, and thus will learn the joy of accomplishment. Having once succeeded in writing a connected, coherent, and complete exercise, their halting pens will be encouraged for future flights.

Undoubtedly the teaching of English composition is the most difficult work of the elementary school. British children, as a rule, are tongue-tied; they do not converse easily and fluently on any subject. Perhaps the practice, now fairly common, of getting the children to "relate" instead of giving rapid and monosyllabic answers to a fusillade of questions is doing something to obviate the defect. There is very little intelligent conversation in their homes; so few subjects beyond the sordid cares of the workaday life ever come up for discussion at the tea-table or fireside, and what conversation they do hear is too often couched in ungrammatical English. The teaching of English composition in the elementary school gives many a teacher a heartache.

Now, the writing of an essay on however familiar a subject is most difficult to the untrained person, because it implies the doing of several things at the same time. There is the mental groping for information or a line of argument; the orderly arrangement of the information or the logical development of the subject; the search for the language in which to clothe the various statements; and finally the mechanical work of setting down the result on paper. No wonder that the child, when suddenly asked to write an essay on, say, "A Day in the Country," "A Walk in the Town," or some such subject, with the details of which it is perfectly familiar, frequently produces a meagre string of incoherencies. Every teacher knows that the most extraordinary vagaries of spelling find their way into composition exercises, and no one need be surprised. The child's mind is bewildered in the endeavour to think and do simultaneously.

Now, at the first stage in teaching composition, the picture is a real aid to the child. It simplifies his task in a high degree. The information is already before him in pictorial form; the order of the pictures determines the order of treatment. All that the child has to do is to clothe its statements in suitable language and set them down. This simplification is, of course, a staff to be discarded when facility has been attained, but its utility as a help up the steep and rugged slopes of Parnassus cannot be denied.

"Nothing," says Byron, "so difficult as a beginning." Even practised writers turn their pens many times and chew the cud of reflection for a considerable space before they hit upon the striking and fruitful initial sentences. We have known leader writers who pen their opening paragraphs last. Little wonder, then, that the child beginning a composition exercise wastes much time in making a start. With the pictures, such as are here presented, a beginning can be made at once. There is no need for the preliminary informative lesson which so often precedes the writing of the exercise.

There are several subsidiary advantages from this method. The criticism of composition exercises by the scholars is rendered valuable, because all the children have the same picture before them, and all have striven to find the best descriptive words. They are, therefore, in a position to appreciate the force or weakness, the suitability or otherwise, of the various epithets which have been employed. "Reading a picture" is an art which few people possess. All, of course, observe the broad outlines; but the minutiæ, the accessories, the background, the grouping, the symbolic meaning of the whole, are too often seen and not seen. The children who write composition exercises from pictures develop their power of seeing. They learn to scrutinise detail, to worm out the meaning of each component part, and thus a picture, in the course of time, yields up to them its full flavour of knowledge and æsthetic delight.

J. E. P.

ITALIAN EDUCATION.—We have just received the report, written by Miss Maria A. Degani of the Maria Grey Training College, on *Some Aspects of Italian Education*. Miss Degani was the holder of the Gilchrist Travelling Scholarship for 1903, and this little brochure gives a summary of her observations and inferences while visiting Italian schools. The matters chiefly dealt with are the teaching of History and of the mother tongue, but the book gives a clear insight into the general organisation of education and the internal arrangements of schools. We are pleased to learn that class prejudices do not interfere with the proper co-ordination of educational work. "The elementary school is the starting-point for every child; it leads up to all other schools." We heartily commend the book to the attention of our readers.

Our Modern Language Section.

ON THE STUDY OF GERMAN.

IV.

THE subjunctive is not used as much in German as in French, but a point of likeness between the two languages is afforded by the fact that it follows certain verbs and conjunctions. The verbs which it follows are especially those signifying to *love, desire, command, beg, permit,* and *fear;* as, *Bitten Sie Ihren Bruder, das er bald komme.* The conjunctions which it follows are such as *wenn, damit, als wenn;* as, *Ich würde den Schüler loben, wenn er fleissig wäre.*

A difference between the use of the subjunctive in French and its use in German is that in the latter language the subjunctive is the mood of indirect narration; as, *Meine Schwester sagte mir, dass sie bald kommen werde.*

The above are merely the broad features in the use of the subjunctive. Only constant reading and conversation will enable the student to use this form of the verb idiomatically and freely.

The use of *werden* to form the passive voice in German does not exclude the use of *sein* (to be). In the latter case what is expressed is a *state* and not an *action;* as, *Ich bin angekleidet.*

Werden expresses the result of an action on a person or a thing; as, *Das verlorene Kind wurde gefunden.*

Care must be taken to distinguish the use of *sein* with the past participles of transitive verbs, and with the past participles of neuter verbs. In the latter case it helps to form the compound tenses of such verbs instead of *haben,* just as in French *être* and not *avoir* is the auxiliary used to form the compound tenses of such verbs as *venir, arriver,* etc. It is used in German with such verbs as *gehen, kommen, werden.* Again, as in French, the use of the passive may be avoided by the employment of the impersonal pronoun *Man.* This is the case when the doer of the action is not mentioned. Thus we may say both *Das Kind wird gestrafen* and *Man straft das Kind.*

The separable verb should not prove so much of a difficulty to the English as to the French student. In English we may say, "I threw the toy *away,*" and "I put the door *to.*" In these cases *threw-away* and *put to* would be expressed by one verb in French, whereas our own mode of expression is exactly parallel with the corresponding German *Ich warf das Spielzeug weg* and *Ich machte die Thüre zu.* An important difference, however, is that we cannot, as in German, prefix the prepositional or adverbial part to the verb. In German, when the separable verb comes in a subordinate sentence, the part which was placed at the end in the simple sentence is prefixed to the verb; as, *Ich wusste dass Sie das Spielzeug wegwarfen* and *Ich bemerkte dass er die Thüre zumachte.* In the case of a separable verb coming in a subordinate sentence, the separable part and the verb can only be separated by the past participle prefix *ge;* as, *Ich weiss, dass er das Spielzeug weggewonfen hat.*

In order to continue our short review of the peculiarities of the German verb we have had to assume in the examples given some knowledge of the order of the words in a German sentence. The two are so intimately connected that the question of the verb in German cannot very well be studied apart from that of the order of the words in the sentence. This, again, naturally divides itself into the study of the order of words in the simple sentence, and of their arrangement in the subordinate clause of the complex sentence.

In the simple sentence the two chief variations are:—

1. The principal part of a compound verb comes last. Thus we say, *Ich gebe ihm das Buch,* but *Ich habe ihm das Buch gegeben;* and *Ich stehe früh auf,* but *Ich werde früh aufsteken.*

2. The subject and predicate are inverted, not merely when the verb is put into the interrogative form, but when for the sake of emphasis the completion or the extension of the predicate is placed first; as, *Morgen werde ich früh aufstehen. Ein Lügner bin ich nicht.*

In almost all subordinate sentences we find an important difference between the order of the words in this sentence and that in the simple sentence. The verb, whether simple or compound, is placed last. In the case of a compound verb it is the *finite* part—that is, that which has the inflection of number and person—which is placed last of all. Thus we say, *Ich versichere Sie, dass ich Ihr Freund bin,* and *Der Mann, welcher dieses Haus gebaut hat, ist gestorben.*

The single exception to the rule of subordinative conjunctions requiring the verb in the sentence introduced by them to be at the end of the sentence is *denn;* as, *Ich kann noch nicht ausgehen, denn ich muss einen Brief schreiben.*

Another class of conjunctions is that of the *adverbial conjunctions.* Sentences introduced by these require merely a transposition of the order of subject and predicate, without requiring the latter to be placed at the end of the sentence. The treatment of conjunctions of this class is not without difficulties, as it is not easy at times to determine whether their adverbial or conjunctive force is the more predominant. *Also* may be taken as a type of this class of conjunction; as, *Ich erwarte meinen Bruder, also muss ich zu Hause bleiben.*

We conclude our survey of the most important points in connection with the order of the words in the German sentence with the change which accompanies the placing of the subordinate sentence before the principal sentence. In this case the subject and the predicate of the principal sentence exchange places. Thus, for instance, we say, *Ich muss diese Arbeit vollenden, bevor ich frühstücke.*

If the subordinate sentence precedes the principal, the order of the words will be, *Bevor ich frühstücke, muss ich diese Arbeit vollenden.*

(To be continued.)

DIFFICULTIES OF FRENCH IDIOMS AND CONSTRUCTIONS.

XI.

THE conjunctions which govern the subjunctive must be carefully memorised by the pupil, who, in addition to the exercises given in his grammar, should frequently construct typical sentences for himself. It is only by constant practice of this nature that he will really assimilate the peculiarities of these conjunctions, and acquire ease and facility in using them. The conjunctions *à moins que, de crainte que, de peur que* require *ne* as well as the subjunctive; as, *Je courus, de crainte que je n'arrivasse trop tard.*

If we wish to express "not" in English, *pas* must be added to the subjunctive; as, *Je m'arrêtai à la porte, de peur qu'il ne me vit pas.*

In the use of the expressions *quoique* and *quoi que, quelque.....que* and *quel (-s) (quelle -s) que.....,* students sometimes find a difficulty.

Quoique means "although," and is purely a conjunction; as, *Quoique vous soyez riche, vous êtes malheureux.*

Quoi que is the compound relative "whatever;" as, *Quoi que vous fassiez, vous n'échapperez pas.*

Quelque.....que is translated into English by the concessive adverb "however."

Quelque has an adverbial force, and is followed by an adjective; *que* is a conjunction—as, *Quelque puissant que vous soyez, vous ne pouvez pas le forcer à se soumettre.*

In *quel (-s)* or *quelle (-s) que.....,* the first part of the expression is a pronoun, which must agree in number and gender with the noun which follows, and *que* is a conjunction; as, *Quelles que soient vos raisons, vous ne saurez pas me persuader.*

Another special point in connection with the use of con-

junctions in French is the fact that *que* is used to avoid repeating *comme, quand,* and *si;* as, *Quand vous arriverez à Londres, et que vous vous serez reposé un peu, nous ferons une promenade ensemble.*

A particular feature attending this usage of *que* is that when used instead of *si* the subjunctive follows it; as, *Si vous le voyez, et qu'il ne veuille pas vous le donner, dites-lui de ma part que j'en ai besoin.*

While it is comparatively easy to lay down rules for the use of particular parts of speech and verbal and other forms in French, it is practically an impossible task for a teacher to lay down definite directions for acquiring a good style in French composition. The special features of a good style in French are *clearness, grace, ease,* and *harmony* of expression. We have placed clearness first, as it is the quality in French style which is most important. To attain this end, long and involved sentences must not be used where they cannot be used without the sacrifice of this quality. On the other hand, a continued succession of short, simple sentences leads to jerkiness of style. The student must endeavour, while not sacrificing the paramount consideration of clearness, to avoid a succession of short, snappy sentences. It has been said that to acquire an easy style is one of the most difficult of accomplishments, and only a few Englishmen, with special opportunities and natural gifts, have ever succeeded in writing French in a style which may be commended as embodying the chief beauties of expression. Anthony Hamilton, whose *Mémoires du Comte de Grammont* is a perfect pattern of easy and harmonious French, is a case in point of an Englishman who succeeded to a degree that few Frenchmen have ever attained. But it is possible for any English student of French who pursues the right course to acquire the power of writing correct and graceful French. Text-books on French composition will give him some assistance, but the study of good authors will give him more. He should read with care the works of such great exponents of style as Bossuet, Fléchier, La Bruyère, Voltaire, and many others who may be cited; and he will by the processes of imitation and assimilation gradually acquire the power of writing idiomatic French, and set up for himself a mental standard by which he will be able to assess at their true value his own efforts in composition.

With the present number of the *Practical Teacher* we bring this series of papers to a conclusion. If they have helped in any way to overcome some of the difficulties of our students, and to direct them into the best methods of study, our end will have been attained.

FRENCH PRIZE COMPETITION.

RULES (as usual).

A Prize of Half a Guinea is offered for the best rendering into English of the following extract:—

Le séjour de l'estaminet était une habitude invétérée chez le capitaine. Il y satisfaisait à la fois les trois vices égaux dans son cœur: le tabac, l'absinthe et les cartes. Sa vie toute entière s'y était écoulée, et il aurait pu dresser, de toutes les villes où il avait garnisonné, un plan par cantines, marchands de tabac à comptoir, cafés et cercles militaires. Il ne se sentait vraiment à son aise qu'une fois assis sur le velours ras d'une banquette, devant un carré de drap vert près duquel s'amoncellent les chopes et les soucoupes. Jamais il n'avait manqué, après avoir attaché son sabre et son képi à la patère et s'être installé en lâchant quelques boutons de sa tunique, de pousser un profond soupir de soulagement et de s'écrier, "Ça va mieux." Son premier soin fut donc de rechercher l'établissement qu'il fréquenterait, et, après avoir fait un tour de ville sans rien trouver à sa convenance, il arrêta son regard de connaisseur sur le Café Prosper. Ce n'était pas son idéal. L'extérieur offrait bien quelques détails par trop provinciaux. Mais l'intérieur plut au capitaine. Il fut réjoui dès son entrée, par le bruit du timbre que toucha la dame du comptoir, en robe claire, avec un ruban ponceau dans ses cheveux bien pommadés. Il constata que la salle était gaie, propre, également semée de sable jaune; il en fit le tour, se regarda passer dans les glaces, se fit servir, fuma, trouva le divan moëlleux et l'absinthe savoureuse, et fut assez indulgent pour ne pas se plaindre des mouches qui se baignaient dans les consommations avec une familiarité toute campagnarde. Huit jours après, il était devenu un pilier du Café Prosper.

FRANÇOIS COPPÉE.

RESULT OF THE SEPTEMBER COMPETITION.

The prize is awarded to "Round Tower." (Will "Round Tower" kindly send name and address for publication?)

First Class.—Esperantisto, Oakover, Eicarg, Gawayn, Contina, Le Calvados, Tyro, Vivette, Treize, D'Arcy, Friar Tuck, Lackwit, Adlitam, Shakspere, Cassland, Yorick, Bees, C.D.B., Quatre-vingt treize, Infelix, Dijon, E.S.L.A., Hollandais, Snowdrop, Colet, Edzell, Nemo, Darroch, Kelso, Noremac, Nil Desperandum, Meriden, Welburn, Jane, Maxwell, Elmdon, P.P.P., Grimbarian, Elf, Drooko R, Edelweiss, Bam, Klopstock, D.B.G., Sanscrit, M.B., Amiechen, Yorkist, Daisy, Automobile, Isabel, Clio, Gipsy.

Second Class.—Doone, Clip, Qui vive, Ranunculus, Guillaume, Unus, Bracebridge, Young, Chloe, Ivy, Beth, Jessie, Dot, S.V.M.C., Gradire, England, F.A.W., Htide, G.F., Bea, Jess, Marygold, Bismuth, Isobel, Silas.

The name and address of C.E.M, the successful competitor in July, are:—Miss C. E. Montizambert, The Grove, Dunboyne, Co. Meath.

Report.

In the last report I commented upon the increasingly less number of literal translations that are sent in. I cannot say that the present batch of papers shows any diminution of this tendency, but there are many evidences of another prevailing fault in translation, which is to give a rendering of a word in some other sense than the one in which it is used, or to mistake one word for another somewhat like it. Thus *vanter* is translated "boast of:" *aucun* is "no;" *vit* is "saw;" *réclame* is "complain of;" *une pièce d'Alarçon* is "a room of Alarçon;" *versent la joie* is "shed the joy," "upset the joy," and "spill the joy;" *prétendre* is "to pretend;" *du coupon qui ne se paye pas,* "of the dissatisfied remnant;" and so forth. The moral of all this is that the words over which students trip are imperfectly assimilated, and they are imperfectly assimilated because the reading of those who make such errors is too limited in scope and scant in volume.

Prize Translation.

We cannot too highly extol the cheerful temperament of the Spaniard; it is a challenge by man to destiny, a victory of mind over matter, a miracle, a work of grace. Just think of it! a cheerfulness which has withstood three centuries of the most crushing rule ever endured by a European people! a gaiety which has survived the Inquisition, and the gloom and silence of Philip the Second! This cheerful disposition which resists everything needs but little sustenance; it demands but a moderate upkeep, and in fact is self-supporting. In a play by Alarçon, a valet, addressing his master, exclaims, "What a singular man you are! You don't drink at the tavern, and yet you enjoy yourself there; your very eyes, my lord, overflow with joy." In the Peninsula there is an abundance of those eyes that overflow with joy, and this joy has generated that inexpensive happiness which consists of sunshine, indolence, gossip, guitar music, halfpenny newspapers, farthing cigarettes, a little salt cod, no end of glasses of water, and the hope of seeing half a dozen well-horned bulls killed on the coming Sunday. The capital of Spain is full of people who are content because they desire to be so; therefore the proverb runs that perfect happiness consists in living on the banks of the Manzanares, and that the second stage would be to be lodged in paradise, if only there were a peephole up there to look down at Madrid. No, it is not too bold to maintain that in spite of the Carlists and the incendiaries, in spite of all the bloodshed and the unpaid dividends, there are to-day in Spain, such as it is, more contented people, more genuine happiness, than in Prussia, the most government-ridden of countries, or in industrious and wealthy England.

ROUND TOWER.

OUR TUTORIAL SECTION

OUR PUPIL TEACHERS' AND SCHOLARSHIP COURSE.

BY ARTHUR T. FLUX,

Late Principal of the Belvedere Pupil Teacher Centre, First on Scholarship List; Author of "Scholarship School Management," "Building of the British Empire," etc.

SCHOLARSHIP COURSE FOR DECEMBER 1904.
Tenth Month—October.

Work to be Prepared.

1. *Reading and Repetition.*—Usual regular practice.

2. *Teaching.*—The teaching of history—chap. x., *Scholarship School Management.* History is always a popular subject in schools, and its popularity is greatly enhanced if it is properly taught. If the lesson is a mere narration of facts, with little or no attempt to connect them logically with other points, there is still some interest; but if each lesson is made one of a series of pictures of national life, explaining what has gone before and foretelling what is coming in the future, not only is the mere interest increased, but a very great amount of valuable exercise in reasoning and judgment is afforded. The great art in teaching history is to select such facts as will appeal to the scholars, and then to present them, not as isolated instances, but in connection with other events. What is suitable to one class may be utterly unsuitable to another. The age and surroundings of the children must guide the teacher in making this selection.

The connecting link in geography is place; in history it is time, cause, and effect. Great national movements are produced by centuries of preparation; great men, even, are a product of their times. A Shakespeare was impossible in the fourteenth century. Had he existed, his genius would have had no scope. Every effort, therefore, should be made to trace causes and effects, and in this young teachers are frequently very deficient. To say that the Peasants' Revolt was caused by an insult to Tyler's daughter is nonsense. The cause lies much deeper, and though that might have been the spark which produced the general conflagration, it cannot be credited that tens of thousands of men would rise for such a comparatively trivial matter. From a long experience, and from the marking of thousands of notes of lessons in history, it is evident that the average pupil teacher fails entirely to give a good lesson, or, at any rate, to write good notes, because this linking with past and present is rarely attempted. No lesson on Bannockburn, or on any other battle, can be intelligible without a slight *résumé* of the events leading to it, and some deductions as to its after effects.

One of the easiest methods of interesting a class is by biography of great men; and why? Because the life forms just that connecting link which is necessary in young minds. A class could obtain a very fair idea of national history from well-taught lives of twenty or thirty prominent men. Care must be taken that a just appreciation of a man's life and times is given, and that he is properly located in his period. It is a good plan to have in every classroom a long sheet of paper, marked off into centuries, so that in every lesson the exact period referred to may be prominently marked on it.

3. *Drawing.*—One or two copies each week. Remember that ease and grace are far more desirable than rigid accuracy of detail. By laborious effort a conventional shape may be reproduced, which is fairly correct in details, and yet lacks altogether any artistic merit.

4. *Music.*—Revise any weak points, and work the paper given below.

5. *Penmanship.*—Ten minutes' daily practice, and great care at all times.

6. *Composition.*—Write one or two essays each week on such subjects as:—

(1.) Reproduce in your own words the substance of one of Bacon's essays you have studied.

(2.) The difference in character between town people and country people.

(3.) The growth of popular representation in England.

(4.) The Jacobite rebellions.

(5.) The battlefields of Europe.

(6.) Religious movements in England since the Reformation.

(7.) Scientific advance in the nineteenth century.

(8.) The French Revolution.

Read up the subject thoroughly, unless you are well acquainted with it. A full head is necessary for a good essay. Arrange your facts under sections before you commence to write.

Notes on the subjects set:—

(1.) This is a very likely question for the examination. If you have studied the essays carefully, and learnt an analysis as you were advised, it will present no difficulty. Endeavour to use your own phraseology; unless you are careful, you will unconsciously adopt that of the author.

(2.) This is a wide subject: which of the two classes is superior to the other it is difficult to determine. The townsman generally has educational facilities in advance of the countryman, and living in a crowded city is itself an education in that smartness and quick thought which is usually absent in one dwelling in the country. On the other hand, this smartness may readily develop into dishonesty and knavery, and it sometimes gives a superficial gloss which hides the real character.

(3.) This depends upon a good knowledge of history. The following heads might be taken:—

(*a*) The commencement by De Montfort's action.
(*b*) Development under the Angevin and Lancastrian kings.
(*c*) The Disfranchising Act of 1430, and its effects.
(*d*) The long struggle from 1455 to 1689.
(*e*) The Reform Bill, and its necessity.
(*f*) Subsequent bills, and extensions of the franchise.

(4.) Take as heads:—

(*a*) The causes.—Antipathy of the Tory party to the Whigs. Help given by France. Clanship of the Highlanders, etc.

(*b*) Reasons for failure.—Improved government did not warrant change. Popular control better than Stuart tyranny. National debt disinclined people to change, etc.

Do not give a *history* of the Rebellion.

(5.) This is a subject which may be taken in a variety of ways. It is impossible to take each field and say something about it. What the examiner (it was set at the recent Matriculation Exam.) probably wanted was some discussion as to their distribution, and the causes for such distribution—for example, the north of France, and Belgium, resulting from contests either between English and French or between French and Germans; the Plain of Lombardy, when the Germanic nations have come into contact with the Romance peoples; the Rhine valley—Germans and French; the Middle and Lower Danube—contests between the Turks and Austrians or Russians. Battlefields are mainly found on the border line between peoples of different races. When they occur in other places, it is due to civil wars or incursions.

(6.) Trace the split into Established Church and Puritans or Nonconformists; the division of the latter into sects; the stagnation during the seventeenth and part of eighteenth centuries; the teaching of Wesley; the modern growth of sects; the Salvation Army, etc.

(7.) This, again, is a matter of history, with unlimited choice of subjects.

(8.) No difficulty should be found with this, as it was prepared last month. The causes should be traced—the change from attempts at legitimate reform by the National Assembly to the madness of the Paris mob, the gradual establishment of an empire, etc.

7. *English.*—

(*a*) Twenty-five roots and meanings per week.

(*b*) *Much Ado about Nothing*, Act v., Scene 1., to the end.

(*c*) The laws of verse.

(*d*) Revise the history of the language up to the Norman Conquest.

(*e*) Learn (if not already done) analyses of the essays set.

Prosody or the laws of verse will be found in any good text-book.

and every student should be able to scan poetry and determine the particular metre of any line.

Answer the questions set below.

8. *Geography.*—

(*a*) Revise the geography of South America.

(*b*) The geography of the British possessions in Polynesia.

The chief points in the geography of South America are (1) its compact outline and the regularity of its relief—called the "model continent." The backbone or dividing line runs down near the west coast, which produces a series of great rivers flowing east, and none flowing west. (2) The river basins. Orinoco with llanos; Amazon and its selvas; La Plata and the pampas. (3) The wonderful wealth and fertility of the Amazon valley. (4) The mountain system. (5) The natural products, noting especially animal and vegetable products *peculiar* to the country (frequently set as question). (6) The states, their capitals and government, chief towns, imports and exports.

9. *History.*—The reigns of George the Fourth and William the Fourth.

Chief points:—

George the Fourth.—(*a*) Cato Street conspiracy—an attempt to copy the methods of the French Revolution in England. Failed because the same grievances were not felt.

(*b*) Repeal of the old Navigation Act.

(*c*) The battle of Navarino—the causes which led up to it, and its very important results.

(*d*) Catholic emancipation. Note that the Catholics had been exempted from the privileges of the Toleration Act of William the Third, and were practically deprived of all civil and religious rights. The Test and Corporation Acts were only repealed in 1828.

William the Fourth.—(*a*) The early years of this reign were occupied in the great struggle over the Reform Bill, which must be very carefully studied. The reasons why reform in representation was urgently needed must be noted, and the measures taken to obtain it.

(*b*) The effects of the Reform Bill were seen in the general tone of the legislation which immediately followed.

(1.) Grants for educational purposes.

(2.) Abolition of slavery. (The slave *trade* had been condemned twenty years before.)

(3.) Poor Law Bill, which was urgently needed.

(4.) The Municipal Act, which practically did for the government of towns what the Reform Bill had done for the country at large.

10. *Arithmetic.*—Christian and Collar, chap. lviii. Work the first twelve of the miscellaneous problems, Exercise 118.

Work the following paper (set 1902):—

(1.) How would you teach children beginning arithmetic to perform such operations as 8 + 7? By what steps would you teach them to proceed to such exercises as 18 + 7, 28 + 7?

(2.) A child works the division 48773 ÷ 19, and says the quotient is 25517. What error was made? How would you teach children to avoid the error?

(3.) Two boys work this exercise: "A tradesman makes a profit of 7½ per cent. by selling goods at 7s. 2d. per lb.; at what price per lb. must he sell them in order to make a profit of 12½ per cent.?"

The first boy states his sum—107½ : 7s. 2d. :: 112½ : answer, and obtains his answer. The second states his sum thus—7½ : 12½ :: 7s. 2d. : answer, and obtains his answer. Does either obtain a correct result? Does either state his working correctly?

(4.) What is a recurring decimal? How can you tell whether a given fraction will produce (*a*) a terminating decimal, or (*b*) a recurring decimal? In case (*b*) how can you put a limit to the number of figures in the period?

(5.) Explain what you mean by, and prove, the statement—$\frac{4}{5}$ of $\frac{5}{8} = \frac{4}{8}$. If $\frac{4}{9}$ of a quantity lies between $\frac{3}{7}$ and $\frac{4}{7}$, between what limits does the fraction itself lie? Show from your answer which of these last two fractions is the greater.

(6.) Gold is worth £3, 18s. per ounce. If a sheet of gold leaf, 5 inches by 4 inches, cost a penny, and a cubic inch of gold weighs 10·19 ounces, express in decimals of an inch (correct to six places) the thickness of the gold leaf.

(7.) Taking a metre to be 39·37 inches, how many metre lengths can be cut from a tape 20 yards long, and what length in inches will be left over?

(8.) If an article may be insured by a single payment of 10 per cent. on the amount for which it is insured, to what amount should I insure an article worth £450, so that in the event of loss I may recover both the value of the article and the insurance payment?

(9.) A man intended to invest £855 in the 3 per cents. Consols at 114, but before he did so they were converted to the 2½ per cents. What ought to be the price of the stock after conversion if he is to secure the same income as before, and what will that income be?

(10.) In Germany Réaumur's thermometer is generally used, in France the Centigrade, and in England Fahrenheit's. Their freezing-points are 0°, 0°, and 32°, and their boiling-points are 80°, 100°, and 212° respectively. How would the Germans and French express a temperature of 98° F.?

(11.) A school charged a weekly fee of 6d. In consequence of the fee being lowered, there was an increase of 20 per cent. in the number of children, but the total weekly receipts were less by 40 per cent. What was the amount of the new fee?

(12.) The walls of a room 22 feet by 18 feet are to be papered. The paper is 28 inches wide, and is hung in strips from top to bottom. One workman proposed to reduce the width of the strips of paper to 24 inches. Another proposes to begin at a corner, and proceed round the room until at last a portion remains narrower than the paper, and then to reduce the width of the last strip so as to cover the vacant space exactly. Find the ratio of the amount of paper wasted in the two cases.

(13.) A tank is 45 feet long, 18 feet wide, and 8 feet deep. It is filled by a pipe, of which the cross section is 48 square inches, and through which a length of 6 feet of water passes in each second. Find the length of time it will take to fill the tank, and the quantity of water it contains (one cubic foot = 62·5 gallons). If the surface of the water falls one inch, how many gallons have been removed?

Notes on the solutions:—

(2.) Working through and watching the given quotient, it will be seen that the second 5 should be 6.

(3.) The first boy gets the right answer, but has stated incorrectly. It should be 107½ : 112½ :: 7s. 2d. : answer. There can be no ratio between 107½ and 7s. 2d. The second boy does not get the correct answer, as the two prices are not equal in ratio to the *gains* but to the *total* prices.

(4.) See text-book.

(5.) $\frac{3}{4} = \frac{1}{6}\frac{2}{8}\frac{4}{4}$; $\frac{2}{3} = \frac{1}{6}\frac{2}{8}\frac{3}{3}$.

Taking the smallest value $\frac{1}{6}\frac{2}{8}\frac{4}{4}$, the quantity = $\frac{4}{9} \times \frac{1}{6}\frac{2}{8}\frac{4}{4}$.

Taking the largest value $\frac{1}{6}\frac{2}{8}\frac{3}{3}$, the quantity = $\frac{4}{9} \times \frac{1}{6}\frac{2}{8}\frac{3}{3}$

(6.) 20 square inches are worth 1d.

∴ 20 square inches weigh $\frac{1}{9}\frac{1}{3}\frac{7}{6}$ oz.

10·19 oz. weigh 1 cub. in.

1 oz. weighs $\frac{1}{10 \cdot 19}$ cub. in.

$\frac{1}{9}\frac{1}{3}\frac{7}{6}$ oz. weighs $\frac{1}{10 \cdot 19 \times 936}$ cub. in.

∴ $\frac{1}{10 \cdot 19 \times 936} \div 20$ in. = thickness.

(7.) 20 yards = 720 inches.

∴ Number of metres = 39·37)720· (18

393·7

326·30

314·96

11·34

Care must be taken with the remainder.

(8.) By paying 10 we insure for 100, of which 90 is value of article and 10 is return of insurance. Therefore to obtain £450 and insurance, we insure on £500.

(9.) In 3 per cent. at 114 he gets as interest $\frac{3}{1}\frac{0}{1}\frac{0}{4}$, or $\frac{1}{3}\frac{5}{8}$ of his money. If he gets 2½, this should be $\frac{1}{3}\frac{5}{8}$ of price. Therefore price = 95, etc.

(10.) See text-book.

(11.) If N equals the children, total fees = 6N pence.

Under new conditions $\frac{6N}{5}$ children produce $\frac{18N}{5}$ pence.

∴ the fee is $\frac{18N}{5} \div \frac{6N}{5} = 3$d.

(12.) Total distance round room = 80 feet. In case 1, it will take 40 strips, and there will be 40 × 4 inches waste. In case 2, it will take $\frac{8}{2}\frac{0}{8}\frac{0}{}$ = 34 strips, and leave 8 inches. To fill this, a piece must be cut, and will leave as waste 20 inches. The ratio is therefore 160 : 20, or 8 : 1.

(13.) Cubical content = 45 × 18 × 8 cub. feet

$= \frac{45 \times 18 \times 8}{62 \cdot 5}$ gallons.

Amount in one second = $\frac{4}{1}\frac{8}{4}\frac{0}{4}$ × 6 cub. feet.

Time to fill = (45 × 18 × 8) ÷ (2).

11. *Algebra.*—Geometrical and harmonical progression. Be prepared to establish the formulæ used.

12. *Euclid.*—Revise first half of Book I., with ten deductions per week.

13. *Elementary Science.*—Preparation and properties of nitric acid, and the common metals—lead, copper, etc.

14. *General Information.*—Read up answers to one or two of the papers in the book of questions used.

Test Paper in General Information.

Answers will be marked gratis if sent direct to Mr. A. T. Flux, Oakleigh, Belvedere, Kent, with stamped addressed envelope for the return. *The coupon of the current number must be enclosed.*

1. Where are the following places, and for what famous ?—Pæstum, Elephanta, Fingal's Cave, Yosemite, Sandy Hook, Karnak, and Carmel.

2. Explain :—City of David, City of the Seven Hills, City of Refuge, City of London.

3. How is it possible to tell the materials of which a star is composed ?

4. With what events are the following ships connected ?—The *Golden Hind*, the *Centurion*, the *Victory*, the *White Ship*, the *Endeavour*, the *Challenger*, the *Shannon*.

5. Describe the different kinds of clouds. Why do some look white, others very dark ? Why do they look red sometimes in the evening ?

6. Who were Hercules, Orpheus, Mars, Actæon, Juno ?

7. Explain :—Black Art, Black Diamonds, Black Flag, Black-mail, Black Watch.

8. What is a shooting star ?

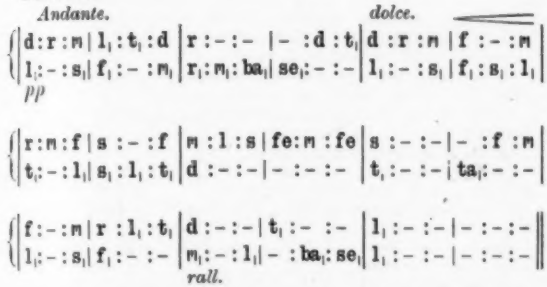
Instead of the usual test questions, some complete test papers (compiled from examination questions) are set this month.

1. Music.

(One hour. Answer *five* questions.)

Doh is B.

Andante. *dolce.*



1. In the second measure name the intervals which occur between the two parts on each of the six pulses.

2. Write out the treble part of the first four measures in two-pulse time, preserving the relative value and duration of the notes.

3. Write out the alto part of the last four measures, place figures over each note, showing its duration in pulses or fractions of a pulse.

4. Explain briefly the meaning of all the signs and marks of expression given.

5. What would be the name of the note which is $\dot{d}^1$ in key C if it appeared in the keys of G, B♭, D, E♭ ?

6. Write a scale in the key of E♭, showing the compass of an average treble of about ten years of age.

2. English.

(Two hours.)

(Answer Question 1, and either Question 2 *or* 3, and five other questions, of which *one* at least must be taken from each of the sections II., III., IV.)

Section 1.

1. Analyse one of the following passages, and parse the words in italics in the passage chosen :—

(*a*) *Let* this *be so*, and doubt not *but* success
Will fashion the event in better shape
Than I *can* lay it down in likelihood.
And if *it sort* not well, you *may* conceal her.

(*b*) It is good *also* not *to try* experiments in states, *except* the necessity *be* urgent or the utility evident ; and *well to beware* that it be the reformation that draweth on the change, and *not* the *desire* of change that pretendeth the reformation.

2. Mention a few rules you would think desirable to give to a class of children who were practising letter-writing as an exercise in composition.

3. At what different periods has our language been enriched with words of Latin origin ? Give examples, and account for any great differences in form of words originally coming from the same Latin word.

4. Write sentences illustrating the different uses of :—

(*a*) I come ; I am coming.

(*b*) I came ; I have come.

(*c*) Will he come ? shall he come ?

Explain fully in the case of each pair why the forms cannot be used interchangeably.

Why is it incorrect to say, "Mr. Gladstone has been Prime Minister," but correct to say, "Lord Rosebery has been Prime Minister" ?

5. Write notes on the etymology of the following :—achieve, bachelor, charm, counterpoise, vouchsafe, quondam, disputation, innovator.

Section 2.

1. Who were Leander, Prester John, Philemon, Dian, Até ? How are they referred to in the play ?

2. Explain six of the following :—bird bolt, a jade's trick, recheat, an agate very vilely cut, hobby horses, comprehend all vagrom men, strange misprision, boys that cog and flout, naughty.

3. Write a character of Beatrice or Hero, supporting your statements by quotations from the play.

Section 3.

1. Give in your own words the substance of Bacon's essay on *Studies*.

2. Give instances of phrases or words used by Bacon which have now become obsolete.

3. Who were Cosmo, Pertinax, Ulysses ? and what is meant by consistories, adamant, humorous, chaos ?

Section 4.

1. To what extent is *David Copperfield* a biography of the author ?

2. Give a description in your own words of Melrose Abbey as viewed by moonlight.

3. Give a brief summary of the "plot" of the tale in *Kenilworth*.

Other papers will be given next month.

PUPIL TEACHERS' COURSE.

For Entrance Examination, 1904.

1. *Reading and Repetition.*—Regular *oral* practice before a competent critic is very necessary to success.

2. *Penmanship.*—Write a page daily in the *Practical Teacher Copy Book*, and use great care at all times.

3. *English.*—(*a*) *Lay of the Last Minstrel*, Canto II. Finish the canto. Learn the exact meaning of all allusions and difficult words, and be prepared to paraphrase and analyse any part and parse any word.

(*b*) Learn ten roots and meanings per week.

(*c*) Learn the Latin prefixes.

(*d*) The grammar and syntax of the conjunction. Learn a good classification (*a*) on the meaning, (*b*) on the function of the conjunction.

4. *Geography.*—The general geography of Europe.

For this month prepare the coastline thoroughly—capes, bays, islands, straits, seas, etc. Draw sketch-maps frequently. Be prepared to answer such questions as the following :—

(1.) Compare and contrast the Baltic and Mediterranean Seas.

(2.) Mention the chief islands in the Mediterranean, and say what you can of one of them.

(3.) What effect has the greatly indented coastline of Europe had upon its development ?

(4.) Describe coasting voyages from Archangel to Copenhagen, St. Petersburg to Brest, Havre to Genoa, Genoa to Constantinople.

(5.) Where and what are the following :—Fjords, Maelstrom, Iviça, Messina, Bosphorus, Gozo, Matapan, Zante ?

(6.) Draw a sketch-map of the Baltic Sea.

5. *History.*—Edward the First and Edward the Second.

Edward the First.—Note the double object of the king—(*a*) to bring all the island under one ruler, hence the Welsh campaign and the interference in Scottish affairs ; (*b*) to place law and order on a firm basis, hence the *legal reforms*, which are very important, and the reconstitution and division of the law courts. Prepare a genealogical table, showing the various claimants to the Scottish throne. Learn the dates and chief provisions of the various great statutes passed.

Edward the Second.—Weak rule. The favourites Gaveston

and the Despensers—learn lives. The battle of Bannockburn, and what brought it about. The Lords Ordainers. The Barons' War, and the deposition of the king.

6. *Arithmetic.*—The metric system. This must be thoroughly done. Learn the various units and their relation to one another, starting from the metre. Thus: the weight of a cubic centimetre of pure water gives the unit of weight = the gramme; the contents of a cubic decimetre = the unit of capacity = the litre; 10 square metres = the are, etc. Work through exercises 76 and 77 in Christian and Collar's new arithmetic. If any difficulty is experienced, send up for elucidation; but little will be found if the theory is carefully studied.

7. *Science.*—The pulley and its applications. The systems of pulleys. Note carefully the difference in mechanical advantage between a fixed and a movable pulley.

8. *Music.*—The value of notes in staff notation—semibreve, minim, crotchet, quaver, etc.

Test Questions.

1. Write as specimens of copy setting:—
   Large hand.—*Carrickfergus.*
   Small hand.—*The ebbing waves of western day*
   Shot o'er the glen their level way.
2. Analyse the following, and parse words in italics:—
   Ye *ween to hear* a melting tale
   Of two true lovers in a dale,
   And *how* the knight, with tender fire,
   To paint his faithful passion *strove.*
3. What is a preposition, and how would you teach a class to distinguish it from a conjunction?
4. Give an account of the general build of Ireland, and explain which is the most flourishing part, and why.
5. Mention the chief ports of Ireland, their imports and exports.
6. Why did all parties unite against John? and how is this shown by the provisions of the Magna Charta?
7. Why is De Montfort's Parliament important? Write a short life of him.
8. Work the following:—
   (1.) Find the value of $(\frac{2}{3} + \frac{5}{8})$ of four guineas + $(\cdot0\dot{0} - \cdot\dot{0}1)$ of £2, 1s. 3d. + (5·05 ÷ ·005) of 5s. Ans. £257, 2s. 2½d.
   (2.) A's share is $\cdot\dot{0}\dot{0}$ of B's, B's is 3·08 of C's, C's is 1·1 of D's. C's share is £2,750. Find A's, B's, and D's.
   Ans. A = £770. B = £8470. D = £2500.
   (3.) How many oranges at £·084375 per dozen should be given in exchange for 378 eggs at ·0625s. each? Ans. 168.
   (4.) A warehouse consists of seven floors. The rent of each floor is ·875 times that of the floor below; the rent of the fourth is £17, 3s. Find that of the lowest. Ans. £25, 12s.
9. What is a lever? Explain the three orders. To which does each of the following belong—an oar in a boat, nut-crackers, fire-tongs, a spade in digging?
10. Rewrite the following, first doubling then halving the value of each note and rest:—

| d :- \| r.m:f \| -.s :m \| r.m :d. ‖

Second Year Course.

1. *Reading and Repetition.*—Take regular daily oral practice.
2. *Penmanship.*—Write a page each day in the *Practical Teacher Copy Book*, and take great care at all times.
3. *Drawing.* One or two copies each week. Aim at smooth, bold curves and good balance rather than fine wiry lines.
4. *English.*—(*a*) Goldsmith's *Traveller*, lines 281–315.

General paraphrase:—We will next turn our attention to Holland, which lies for a considerable part below the level of the adjacent ocean. The people are earnest and steady in their work. In order to keep out the waters of the ocean they are compelled to erect huge dykes, which, pushed forward slowly and steadily, enclose a space from which the water is pumped and new land is added to the country. The ocean, looking over the barrier thus erected, sees what was previously a watery waste turned into a verdant and smiling stretch of country, dotted over with populous towns and flower fields, and intersected by the sluggish canals with lines of willows on their banks, through which the sails of the boats are seen in glimpses.

The nature of the country has had a marked effect on the character of the people. Compelled from the exigencies of the case to toil, they have acquired the habit of work, and with that a love of money. Consequently we see in the land all the outward appearances of wealth, as evinced in their buildings, homes, and pictures; but if examined more closely, this desire for wealth has brought with it many undesirable qualities. To obtain money they do not hesitate to cheat and defraud, and this overpowering passion has made them ready to sell even their liberty. Hence the wealthy classes have practically enslaved the poor, who are merely ignorant machines for labour. In their placid acceptance of their wretched fate, they present a strong contrast to their brave and warlike ancestors the Belgæ, and even to the average Englishman of the present day.

(*b*) Continue exercises in correcting "common mistakes in written and spoken language."

(*c*) Learn fifteen roots and meanings per week.

(*d*) The chief additions to the language since 1600.

5. *History.*—George the Fourth and William the Fourth. (For chief points see Scholarship notes.)

6. *Geography.*—South America. (For chief points see Scholarship notes.)

7. *Arithmetic.*—Discount. Distinguish carefully bankers' and true discount. Work the examples in Christian and Collar, and send up any that you cannot do.

8. *Science.*—Terrestrial magnetism. Properties of loadstone and artificial magnet. How magnets are made. Horseshoe and bar magnets. The earth as a magnet. All the necessary experiments can be worked with a small horseshoe magnet and a few knitting needles.

9. *Euclid.*—Props. 5–8, Book II., with four deductions per week.

10. *Algebra.*—The theory of surds.

Test Questions.

1. Write as specimens of copy setting:—
   Large hand.—*Spasmodically.*
   Small hand.—*At gold's superior charms all freedom flies.*
2. Analyse the following, and parse words in italics:—
   To men of *other* minds my fancy flies,
   Embosomed in the deep where Holland lies.
   Methinks her patient sons before me stand
   Where the broad ocean leans against the land.
3. What effects had the Revival of Learning upon the language?
4. Give an account of Jamaica. Explain the names Windward and Leeward Islands, Greater and Lesser Antilles.
5. Account for the distress in England after the battle of Waterloo. What steps were taken to alleviate it?
6. How was the French Revolution regarded by English people?
7. Work the following:—
   (*a*) What capital would obtain £84, 7s. 5½d. in 2 years and 5 months at 3½ per cent. per annum? Ans. £997, 10s.
   (*b*) In what time will £436, 10s. amount to £558, 18s. 1d. at 7 per cent. per annum? Ans. 4½ years.
   (*c*) In what time will £6739, 17s. 9½d. double itself at 5 per cent. simple interest? Ans. 20 years.
   (*d*) At what rate per cent. does the simple interest on £372, 10s. for 18 years amount to £301, 14s. 6d.? Ans. 4½ per cent.
8. How would you prepare mercuric oxide, and what experiments would you work with it to show its properties and what it was composed of?
9. What is the meaning of lento, leggiero, M = 90, dal segno, calando, agitato?

CORRESPONDENCE: RULES.

To ensure an answer in the next issue, queries must be sent by the 15th of each month.

Name and address of sender, with coupon of current number of THE PRACTICAL TEACHER (and *nom de plume* if desired), must be enclosed.

As a rule, all replies will appear in the Correspondence Column; but any one desiring an immediate reply may obtain it by enclosing a stamped addressed envelope.

All communications and queries with regard to the PUPIL TEACHERS' AND SCHOLARSHIP COURSE should be addressed to "Mr. A. T. FLUX, The Bays, Belvedere, Kent."

MR. GUILBERT PITMAN announces that, commencing with the October issue, the *Shorthand World* will be reduced to 3d. monthly, and will include the first instalment of an exhaustive series of articles, by the well-known expert Mr. Geo. Carl Mares, on the manipulation of the typewriter, with special reference to the acquirement of high speed and "touch" typewriting.

In the literature addressed at the present time to typists there appears generally a lack of something to awaken the higher powers of thought, and to nourish a greater degree of expertness in the manipulation of the writing-machine. These objects, we understand, will in some measure be accomplished by the articles now announced, in which will be concentrated several specialised subjects.

The October number will also include the first of the concluding instalments of "The Legal Typist."

OUR CERTIFICATE COURSE FOR 1905.

BY GEORGE COLLAR, B.A., B.SC.,
Head-master of the Stocksell Pupil Teachers' School.

TEST QUESTIONS ON LAST MONTH'S WORK.

Theory of Teaching.

1. Draw up notes of lessons on the following subjects—(*a*) The suction pump; (*b*) sheep; (*c*) the postal system.
2. What is the use of "pattern reading" in teaching a class to read? Mention any common faults which a good reader should avoid in giving such lessons.
3. Write out some sentences containing five or six words which would present difficulties to each of the three lowest standards, and explain the progressive character of your method.

English Language and Literature.

1. Give a summary of the second act of *Richard the Second*, and show the relation in which it stands to the first act.
2. Compare the meanings of the following words in *Richard the Second* with their present significations—*securely, perspective, crossly.*

English History.

1. What were the Crusades? To what extent did they fulfil their original object, and in what ways did they influence Western Europe?
2. Describe the events leading up to the signing of Magna Charta, and enumerate its chief provisions.
3. Give an outline of the legislative measures passed in the reign of Edward the First.

Geography.

1. Write a description of the climate of the different parts of Europe.
2. Give a sketch of the chief industries of France.

Arithmetic.

1. State and prove the rule for multiplication of fractions.
2. A, B, and C divide £79, 16s. among them, B and C receiving $\frac{1}{2}$ and $\frac{2}{3}$ of A's share respectively. How much does each receive?
3. Find the value of $\dfrac{5\frac{1}{4} \text{ of } 3\frac{3}{4} \div 2\frac{1}{16}}{11\frac{2}{3} \div 2\frac{5}{6} \text{ of } 1\frac{3}{5}}$.

Algebra.

1. State and prove the remainder theorem.
2. Find the factors of the following expressions:—
(*a*) $3ax + 4by - 3ay - 4bx$.
(*b*) $6x^3 + x^2 - 2x + 15$.
(*c*) $2x^5 - 8x^4 + 12x^3 - 8x^2 + 2x$.
(*d*) $x^4 - ax^3 - a^2x^2 - a^3x - 2a^4$.

Geometry.

1. If ABC be any triangle, D the middle point of BC, and E the foot of the perpendicular from A on BC, show that the difference of the squares on AB and AC is equal to twice the rectangle BC, DE.
2. Find a point in a given line produced such that the rectangle contained by the given line and the whole line produced shall be equal to the square on the part produced.
3. If AB is bisected in C and produced to D, so that the square on CD is equal to twice the rectangle AD, CB, show that the square on BD is equal to three times the square on AC.

Elementary Science.

Explain clearly what is meant by *hardness, rigidity, compressibility,* and *elasticity,* and say how they are measured.

NOTES AND SYLLABUS FOR OCTOBER.

English Composition.

Prepare and write essays on—
1. Mountain passes.
2. Trades unions.
3. The life and character of the Duke of Wellington.
4. Methods of study.
5. British trees.

Theory of Teaching.

Prepare carefully the eighth chapter of Collar and Crook's *School Management.* It is a very easy but at the same time a very useless task to show how simple it would be to teach spelling if our language were different; but as we shall probably never see any material change in the system of spelling, we must prepare ourselves for the difficulty of teaching it. Consider first the regular words. These are generally dealt with in the lessons on word-building, and are taken as part of the reading lessons. Facility in spelling is mainly the result of good observation. Anything that trains the children's powers of observation will therefore directly or indirectly improve their spelling. But children differ from one another to a remarkable extent in the objects to which they direct their attention. One boy will know the details and even the numbers of all the locomotives that pass through the neighbouring station, while another will probably regard them all as engines, and perhaps say that every engine has four wheels. The latter may know many things about birds and trees of which the former is ignorant, because he has never observed these things. It is surprising how few people have observed how many claws a cat has, although they are continually handling and even being scratched by cats. Some children notice the individual letters without observing their order; hence they call "on" no, and "from" form, and the combination "ei" leads to endless difficulty.

Children should never spell words that are not before their eyes. Oral spelling is hardly ever required in ordinary matters, and the eye is the most important organ in mastering it. True, the ear and tongue may be used occasionally as auxiliaries. In one sense we may say that spelling should receive attention in every lesson, yet young teachers frequently err by introducing spelling at all sorts of inopportune moments. We find that Scripture lessons are devoted to the spelling of Nebuchadnezzar and other long names, and object lessons are devoted to the spelling of *porosity, malleability,* and other names of properties. Apart from that, an earnest teacher will frequently distract the attention of his class from an experiment in progress to ask the spelling of some word employed. Great judgment must therefore be exercised in finding the right time for spelling.

Lists of disconnected words may be used, as it is a matter of great convenience to have the words collected; but each word should be put into a sentence to impress its use and meaning.

Care must be taken to distinguish a dictation *test* from a dictation *lesson.* The latter is intended to teach; hence the correct spelling of the words should be mastered beforehand. Much harm is done by allowing the child to see the word written improperly, and the wrong impression is hardly eradicated, even by the practice of writing out errors three times. Prevention is better than cure, and it is far better to teach the correct spelling first. A dictation test is, of course, a different thing, and serves to examine the child's knowledge of words.

There are many rules for spelling that the children might learn, and which will guide them in their work. The cases in which the final consonant is doubled before an ending is added (*stop, stopping*), or those in which the final vowel is omitted or modified (*hope, hoping, lady, ladies*), should be carefully taught.

The teacher should keep a notebook in which to enter any irregular words he may come across. The scheme for classifying these words as given in the textbook will be found useful, as it will systematise the work.

English Language and Literature.

Read the Sir Roger de Coverley papers. Notes on these will be found in our number for last May. Study in detail the third act of *Richard the Second.* This act establishes the supremacy of Bolingbroke. In the opening scene Bolingbroke and his supporters reach Bristol in triumph, bringing the favourites Bushy and Green as prisoners. Then the second scene presents Richard at Berkeley Castle with his troops melting away. This scene admirably portrays Richard's character. We see the extremes of confidence and dejection through which he passes, and therein note his weakness. The feeling of delight with which he greets his kingdom on his return we can understand; but the exaggerations spring from a misconception of himself, due to weakness. He imagines himself all-powerful. He does not see his own faults that have led to Bolingbroke's rebellion. He believes that it is due to his absence, and that his return will cause it to vanish. So confident is he of success that he says

> "This earth shall have a feeling, and these stones
> Prove armèd soldiers, ere her native king
> Shall falter under foul rebellion's arms."

In vain do the Bishops of Carlisle and Aumerle remind him that Heaven helps those that help themselves. He believes in his "divine right."

> "Not all the water in the rough, rude sea
> Can wash the balm off from an anointed king;
> The breath of worldly men cannot depose
> The deputy elected by the Lord."

And he declares that "God for his Richard hath in heavenly

pay a glorious angel" to meet each of Bolingbroke's men. At this point Salisbury enters and tells him that the Welshmen "are gone to Bolingbroke, dispersed and fled." Then comes a fit of utter dejection, from which in turn he is raised by Aumerle, and in his reaction he cries,—

"Are we not high?
High be our thoughts: I know my uncle York
Hath power enough to serve our turn."

Then Scroop enters to tell him that the whole kingdom is against him, and that the king's favourites are executed. Then Richard forbids any one to speak of comfort, and is driven to admit that, after all, a king is much like other men. Again he is elated at the thought of his uncle York with his forces; but Scroop says,—

"Your uncle York is joined with Bolingbroke,
And all your northern castles yielded up,
And all your southern gentlemen in arms
Upon his party."

And then Richard again gives way to despair, and cries,—

"What say you now? what comfort have we now?
By heaven, I'll hate him everlastingly
That bids me be of comfort any more."

In the next scene, when Richard meets his cousin at Flint, he talks very majestically.

"You know, my master, God omnipotent
Is mustering in his clouds on our behalf
Armies of pestilence."

But yet his acts are meekness itself, and he follows his cousin to London without more ado, and in his dejection he would willingly exchange his

"large kingdom for a little grave—
A little, little grave, an obscure grave."

From this point our feelings are moved to pity for the king, although his troubles are brought on by his own wilfulness. This is increased by the reminder in the fourth scene that the queen was made to suffer with Richard. The gardener and servant talk in idyllic language, and compare the state to the garden. There is a quiet charm about this scene which should not be overlooked, and we pardon Shakespeare's historical inaccuracy

"In the remembrance of a weeping queen."

Scene i., line 3. *Presently*, at the present moment. It now means "in the future," which is a proof of our procrastinating habits. (See Trench *On the Study of Words.*)

23. *Disparked*, broken down the enclosures. A.S. *parren*, or *sparren*, to enclose.

Scene ii., line 34. *Security*, neglect to take care. Compare II. i. 266.

"And yet we strike not, but *securely* perish."

57. This reference to divine right would be very acceptable to either Elizabeth or James.

86. *Puny*, weak, feeble, literally youngest born. Fr. *puis-né*. A junior judge is called a "puisné judge."

118. *Distaff women*, women accustomed only to holding a distaff—that is, a light stick with a bundle of flax at the top, which they were spinning.

141. Notice the fault in agreement. It cannot be excused.

153. *Model*, a little measure; a diminutive of *modus*. Shakespeare possibly refers to the old belief that man was a "microcosm" or model on a small scale of the macrocosm or great world.

161. *Mortal*, liable to death.

162. *Antic*, the old man. Lat. *antiquus*. In the old morality plays there was frequently an "antiquus," who, however, used to cut capers; hence the modern meaning of the word.

168. *Impregnable*, not able to be taken. The *g* is inserted. O.F. *imprenable*, from Lat. *prehendere*, to take or seize.

174. *Mistook*. The student should make a list of irregular grammatical forms, such as the past participle *mistook* for *mistaken*.

179. *Presently*, at once. See note above on Scene i., line 3.

183. *No worse can come to fight*. This principle is generally accepted in warfare, especially naval warfare.

205. *Beshrew*, curse; from A.S. *sirewan*, to curse. The noun *shrew* was formerly used in a bad sense for a man, now it means an ill-tempered woman. The *shrew-mouse* was so called because its bite was supposed to be fatal, and it was said to lame cattle merely by running over them. Bacon says, "The ant is a wise thing in itself, but a *shrewd* thing in a garden."

212. *To ear the land*, to plough the land. Lat. *aro*, I plough; hence the word *arable*.

Scene iii., line 53. *Perused*. Peruse is from Lat. *per*, and *utor*, *usus*. The word should mean "to use up," to thoroughly use. The change of meaning cannot be accounted for.

67. *The occident*, the west. Lat. *occido*, I set. Compare *orient*, from *orior*, I arise.

114. *Enfranchisement*, restoration to his full freedom and rights.

136. *Sooth*, agreement or assent to what he says. Hence the verb *soothe* meant to agree with, then to flatter, and now to comfort.

"Is it good to *soothe* him in these contraries?"
Com. Errors, IV. iv. 82.

151. *Palmer*, a pilgrim who carried a palm branch to show that he had visited the Holy Land; hence any pilgrim.

155. Suicides were generally buried in the "king's highway."

166. *Still*, ever or always; not in the modern sense of "up to the present." Compare V. v. 8:—

"A generation of *still*-breeding thoughts."

167. *Fretted*—that is, eaten. A.S. *fretan*, to eat, or wear away.

169. Note the omission of the relative pronoun as subject of "digged."

178. *Glistering* = glittering. Phaethon was the son of Apollo the sun-god. On one occasion he obtained permission to drive the chariot of the sun across the heavens for one day. The youth being too weak to check the horses, they rushed out of their usual track and came so near the earth that it was almost set on fire. Thereupon Zeus killed him with a flash of lightning.

179. *Jades*, horses. It now means worthless horses.

185. *Fondly* = foolishly.

Scene iv., line 5. *Bias*. The bias was a weight inserted in one side of a bowl, which gave it a particular twist in bowling. Fr. *biais*, sloping. "To run against the bias" became a proverb to express having to encounter unpropitious circumstances, to go against the will of Heaven.

7. *Measure*, step, rhythm.

13. *Remember*. Here used impersonally, while the complement takes "of." Compare the French idiom—*se souvenir de quelque chose*.

28. *Woe is forerun with woe*—that is, coming events cast their shadows before them.

38. *Noisome*, annoying, troublesome.

95. *Embassage*, the announcement made by an ambassador.

100. Note that in this passage the word *news* is plural, but in Scene iii., line 5, it is singular.

English History.

Prepare to the death of Richard the Third.

The deposition of Richard the Second is of special interest in connection with the play appointed for study. In the play Shakespeare makes Bolingbroke say merely, "In God's name I'll ascend the regal throne." In point of fact, however, when the sentence deposing Richard had been read in Westminster Hall, Henry rose and crossed himself with great solemnity, then advanced to the throne, and said: "In the name of the Father, Son, and Holy Ghost, I, Henry of Lancaster, claim this realm of England and the crown, with all the members and appurtenances thereof, inasmuch as I am descended by right line of blood coming from the good lord, King Henry the Third, and through that right which God of His grace has sent me with help of my kin and of my friends to recover it; the which realm was in point to be ruined through default of governance, and through the overthrowing of its good laws."

It should be carefully noticed that Henry would not give offence by an open claim by right of conquest, nor could he urge that the public good required a change of monarch, for that would be playing into the hands of any one who might later on wish to dethrone him. He purposely went back to Henry the Third instead of to Edward the Third, so as to gain what support he could from the legend—which would not have stood judicial investigation—that his mother's great-grandfather, Edmund of Lancaster, the younger brother of Edward the First, was really the eldest son of Henry the Third, but had been put aside on account of a bodily deformity.

Henry the Fourth was a great favourite with the people on account of his knightly accomplishments and physical powers. He had also high intellectual endowments, but in selfishness and perfidy he was a type of the character of his age. During the last reign he had leagued himself first with Gloucester against the king, then with the king against Gloucester; and although Richard had wronged him, he used perjury and perfidy as instruments to gain his ends with an alacrity and a profusion which threw a slur over his motives throughout the whole enterprise, and showed himself incapable of acting as the nation's disinterested deliverer from misrule, and of acting as protector and guardian for the true heir. When dethroned, Richard had no children, but there were living in 1399 descendants of Lionel, the *third* son of Edward the Third, whereas Henry was descended from John of Gaunt, that king's *fourth* son. Lionel's only child was a daughter, Philippa, who had married Edmund Mortimer, Earl of March. Their son, Roger Mortimer, Earl of March and Ulster, had been recognised by Richard the Second as his heir presumptive, and had been solemnly declared to be so by the

MESSRS. RALPH, HOLLAND & CO.'S PUBLICATIONS.

THE BEST BOOKS FOR STUDENT TEACHERS.

Complete Catalogue free on application.

NOW READY.

A Primer of Biology and Nature Study. By RANDAL MUNDY, B.A., B.Sc. Profusely Illustrated from the Author's own Drawings, and specially written to meet the Requirements of the Scholarship and Certificate Syllabuses. **Price 2s. 6d.**

Clough's Stuart Period. For Certificate, 1906. Crown 8vo, 288 pages, well bound in cloth, with Maps and Illustrations. Specially prepared and written to meet the Requirements of the Certificate Syllabus. **Price 3s. 6d.**

"Clough's 'Periods' have made a name and a place for themselves in the Educational World by their practicability and attractiveness."—*Teachers' Review.*

An Elementary and Intermediate Algebra.

WITH EXERCISES AND ANSWERS.

By the Rev. J. LIGHTFOOT, D.Sc., M.A., *Author of "Elementary Logic," etc.*

This valuable New Work covers all the Algebra generally required for the Scholarship and Certificate Examinations and the Preliminary and Intermediate Examinations at the Universities. A special feature is the very clear and interesting treatment of **Graphic Methods.**

Crown 8vo, 472 pages, strongly bound in cloth. **Price 4s. 6d.** (*Specimen pages post free on application.*)

In the Press. Ready Shortly.

Clough's "The Tudors before Elizabeth" (1487-1558).

The period set for Scholarship, December 1905.

Educational Ideas of Froebel and Pestalozzi. By Dr. F. H. HAYWARD, M.A., B.Sc., Principal of Torquay P.T. School; Author of "The Student's Herbart" and "The Ethical Philosophy of Sidgwick," etc.

Milton's "Paradise Lost" (Book VI.). By A. L. CANN, B.A., Principal of Bolton P.T. School; Editor of "Paradise Lost" (Book III.), "Much Ado About Nothing," etc.

Milton's "Lycidas." By A. L. CANN, B.A.

Milton's Sonnets. By C. W. CROOK, B.A., B.Sc., Editor of Shakespeare's "Richard II.," "Henry V." etc.

Milton's "Areopagitica." By C. W. CROOK, B.A., B.Sc.

*** These Certificate Authors have been prepared by experts who know the difficulties and needs of Certificate Students, and will be found to meet the latest requirements. They are well-arranged, with Introduction, treating all important points. The Text in each case is carefully edited and interleaved for Students' Notes, and full Explanatory Notes are given at the foot of each page.

To be obtained through all Booksellers, or post free at published prices, from—

RALPH, HOLLAND AND CO.,

Educational Publishers, 68 and 69 Temple Chambers, LONDON, E.C.

English Parliament in 1385. Roger accompanied Richard on his expedition to Ireland, and was there killed in action, leaving a son named Edmund and two daughters, one of whom, Anne Mortimer, married the son of Edward of Langley, Edward the Third's fifth son and Duke of York. This lad was only nine years old at the time, and Henry was not the man to forgo the crown within his grasp in order to act as guardian for a youthful relative. This must be borne in mind by the student, as it gives the key to the Wars of the Roses.

A desultory warfare was carried on between England and France; but between England and Scotland there was peace, because the young King James had fallen into the hands of Henry, who detained him; and the Duke of Albany, who was Regent of Scotland, and was anxious to continue in power, kept on good terms with Henry, in order that James should not be restored. James was well treated and educated by Henry, but that does not atone for Henry's meanness and injustice in keeping him a prisoner.

The internal troubles on the side of Wales with Owen Glendower, and the revolt of Northumberland, 1403, are well known. Another rebellion took place in 1405, under the Archbishop of York, the Earl of Northumberland, and the Earl of Nottingham. It was put down, and by fraud and force the three leaders were killed. Henry showed great deference to Parliament, and a willingness to oblige the clergy. The latter led him to consent to the statute for the burning of heretics.

The reign of the popular King Henry the Fifth was short, but is generally well known. The unjustifiable invasion of France forms one of the most important events.

The progress of the war in the next reign and the career of Joan of Arc are too matter-of-fact to require notes here. The constitutional developments require close attention. Apparently the power of Parliament greatly increased in the reign of Henry the Sixth; but really there was not much increase owing to the narrowing of the class that held political power in the towns and boroughs. In the early years of Henry the Sixth's reign, the Duke of Bedford was appointed regent, and the Duke of Gloucester made protector of England in Bedford's absence. Gloucester was bitterly opposed by the Beauforts under Cardinal Beaufort, the king's great-uncle, with whom were John Stafford, who became Archbishop of Canterbury, 1443, and William de la Pole, Earl of Suffolk. After the cardinal's death in 1447, Suffolk and Edmund Beaufort (who became Duke of Somerset in 1444) became the leaders of the party. The Duke of Gloucester strengthened his position by bringing forward into political life Richard Plantagenet, son of the Earl of Cambridge, executed for treason in 1415, and Anne Mortimer. Richard was relieved of the effects of his father's attainder for treason, and succeeded to the titles and estates of his uncles the Duke of York and the Earl of March.

The Beaufort party saw the hopelessness of the attempt to conquer France, and tried for peace; Gloucester and York sought popularity by heading the war party. The Beaufort party increased their power over the king by arranging his marriage with Margaret of Anjou; but as the marriage settlement contained a surrender of Anjou and Maine, the people generally were opposed to it. Gloucester died in 1447, the same year as Cardinal Beaufort. Suffolk now became chief ruler in England under Queen Margaret. Somerset and Archbishop Stafford were his chief coadjutors. They appointed the Duke of York Lieutenant of Ireland, and thus secured his absence. In 1450 the House of Commons impeached Suffolk, who, instead of claiming to be tried "by the lawful judgment of his peers," according to Magna Charta, threw himself on the king's will. The chancellor thereupon pronounced a sentence of banishment for five years. This was clearly illegal, and the lords present protested that it was without their concurrence, and was not to form a precedent. As Suffolk was leaving the country, his vessel was stopped, and after a mock trial, he was executed in a boat by the side of the ship. The responsibility for this act was never fixed on anybody, but the Duke of York clearly was not to blame.

The queen believed that the men of Kent were abettors, and threatened vengeance, and this no doubt hastened Cade's insurrection. This and the events leading to the outbreak of the Wars of the Roses must be studied, as well as the course of the war.

Other points to notice are the personal characters of the monarchs in such times. The character of the king had a great deal to do with the course of history.

Geography.

Finish the geography of the leading states of Europe in detail. Pay special attention to the commerce, industries, and chief towns.

Arithmetic.

Finish vulgar fractions.

The questions set in recent papers require much thought, not only in working out the answer, but frequently in getting at the meaning of the question. The student should spend plenty of time in trying to find out what the question means. Very frequently the answer is absurdly easy, when once you understand what the examiner is asking for.

The following were set last July:—

Write down four questions that involve $21 \div 4$, two requiring $5\frac{1}{4}$ in the answer, and two requiring 5 and 1 over.

This question is an endeavour to find out whether the candidate's common sense is sufficient to enable him to appreciate the difference between a divisible unit and an individual. In the question, "Divide 21 yards of cloth into four equal parts," if we were carrying the division out in practice, we should put $5\frac{1}{4}$ yards in each part. Again, "How many hours would it take to walk 21 miles at 4 miles an hour?" If in this case we say 5 hours and one mile over, we do not complete the work, for it would take a quarter of an hour to walk the other mile. But in such a case as, "I want to share 21 farthings among 4 children; how many can I give them each?" since a farthing cannot be divided, we should share 20 farthings, giving 5 to each child, and having one over. Last example—"How many children can sit in each desk, if 21 children are to be seated an equal number in each of four desks?" Here we must say 5 children and 1 over, since we cannot divide the odd child.

"Show that *division is a short method of working subtraction*, taking $22 \div 6$ as an example.

"Also show how this statement is illustrated by working $85 \div 3$ by long division, being careful to state fully the value and meaning of every line."

The first part is shown by subtracting 6 from 22, then 6 from the remainder, and finding how many operations are necessary to complete the process. The work would be shortened by subtracting multiples of 6. Thus division is only a short method of working a particular class of problem which might be worked by continued subtraction. The working of the example 57842 – 31998 cannot be shortened by division.

"What do you mean by a prime factor? Resolve 56, 60, 72, 91, into prime factors. Thence explain clearly how to find the L.C.M. of these numbers."

See Christian and Collar's Arithmetic, paragraphs 73, 74, 78, and 91.

Algebra.

Continue the study of factors, and work examples in H.C.F. Always resolve the expressions into factors, if you possibly can, before resorting to the mechanical method. The following were set last July as examples in factors:—

1. $9a^2 - 4b^2 - 25c^2 + 20bc$
$= 9a^2 - (4b^2 - 20bc + 25c^2)$
$= 9a^2 - (2b - 5c)^2$
$= (3a + 2b - 5c)(3a - 2b + 5c)$.

2. $a^3 + 27b^3 + 18ab - 8$.

Since we have three numbers which are cubes, and the other is minus three times the roots of the others, the expression is of the form $x^3 + y^3 + z^3 - 3xyz$, the factors of which, it must be remembered, are $(x + y + z)(x^2 + y^2 + z^2 - xy - xz - yz)$.

$\therefore a^3 + 27b^3 - 8 + 18ab = a^3 + (3b)^3 - 2^3 + 3 \cdot 2 \cdot 3ab$
$= (a + 3b - 2)(a^2 + 9b^2 + 4 - 3ab + 2a + 6b)$.

3. $x^2(y - z) + y^2(z - x) + z^2(x - y)$.

Apparently $(y - z)$ is a factor. If so, then by the remainder theorem which we took last month the expression will vanish if $y = z$. Substituting this, we obtain $x^2(z - z) + z^2(z - x) + z^2(x - z)$, which is equal to zero, $\therefore (y - z)$ is a factor. Since the expression is symmetrical, $(z - x)$ and $(x - y)$ must also be factors. As the expression is of three dimensions, there can be no other literal factors. If there is a numerical factor, let this be k; then

$x^2(y - z) + y^2(z - x) + z^2(x - y) = k(y - z)(z - x)(x - y)$.

Substitute any values such as $x = 1$, $y = 2$, $z = 3$.

$1 \times (-1) + 4 \times (2) + 9(-1) = k(-1)(2)(-1)$.

$\therefore -2 = 2k$. $\therefore k = -1$.

Ans. $x^2(y - z) + y^2(z - x) + z^2(x - y) = -(y - z)(z - x)(x - y)$
or $(z - y)(x - z)(y - z)$.

4. $l^3 + (a + b + c)l^2 + (bc + ca + ab)l + abc$.

By trial $(l + a)$, we find that the expression equals 0, if $l = -a$, $\therefore (l + a)$ is a factor, and by the principle of symmetry $(l + b)$ and $(l + c)$ are also factors. Trying as above for the numerical factor, we obtain $k = 1$. Therefore the factors are $(l + a)(l + b)(l + c)$.

Geometry.

Prepare to the end of Book III., Prop. 15.

Elementary Science.

Composition of matter. Indestructibility of matter. Composition of air and water; illustrative experiments.

PROFESSOR MEIKLEJOHN'S SERIES

BOOKS FOR THE SCHOLARSHIP EXAMINATION, 1904-5.

The following Text-Books are used in most of the large Correspondence Colleges and Pupil Teachers' Centres throughout the Country.

A NEW GEOGRAPHY ON THE COMPARATIVE METHOD. With Maps and Diagrams and an Outline of Commercial Geography. By J. M. D. MEIKLEJOHN, M.A. **Thirty-second Edition. 175th Thousand.** *Revised.* Crown 8vo, 630 pp. ... ... **4s. 6d.**

"It appears to me to be admirably suited for teachers and advanced scholars. It is full of matter, and the matter could not be more effectively arranged."—**James Ogilvie, Esq., M.A.**, Principal, The Church of Scotland Training College, Aberdeen.

"The value of the Comparative Method in Educational Matters is comprehensively set forth, both in the arrangement of the text and the Maps and Diagrams. The separation of facts that are of first importance from those that are secondary, the classification of subject-matter, and the systematic use of sectional paragraphs, are equally skilful, and equally conducive to simplicity, clearness, and impressiveness."—**Saturday Review.**

THE BRITISH EMPIRE: Its Geography, Resources, Commerce, Landways, and Waterways. By J. M. D. MEIKLEJOHN, M.A. **Seventh Edition.** *Revised.* Crown 8vo, 350 pp. ... ... **3s. 0d.**

"This is a book which was due to the student, and which he or she will welcome with deserved praise. The usual 'book on the Colonies' is heavy, dull, ill-arranged; this book is the perfection of arrangement."
The Teachers' Aid.

THE COMPARATIVE ATLAS. By J. G. BARTHOLOMEW, F.R.G.S., and edited by Professor MEIKLEJOHN. NEW AND IMPROVED EDITION. Containing 64 Plates, Map Drawing, Geographical Etymology, and a General Index. *New Edition* ... ... **2s. 6d.**

"No atlas that we know at anything like the price gives so much so well."
The Teachers' Monthly.

THE PRINCIPLES AND PRACTICE OF TEACHING AND CLASS MANAGEMENT. By JOSEPH LANDON, F.G.S., late Vice-Principal in the Saltley Training College. **Fifth Edition.** Crown 8vo, 548 pp. ... ... **5s. 0d.**

"We have no hesitation in saying that this is one of the best treatises on this subject which has appeared for some time, and we cannot too strongly recommend it to the attention of all interested in the practical work of education."—**Educational News.**

A NEW HISTORY OF ENGLAND AND GREAT BRITAIN. With Maps and Tables. By J. M. D. MEIKLEJOHN, M.A. **Nineteenth Edition.** Crown 8vo, 740 pp. ... **4s. 6d.**

"Your books are simply indispensable to students preparing for the Certificate Examination and to pupil teachers."
One of His Majesty's Inspectors.

A NEW ARITHMETIC. Theoretical and Practical. By G. A. CHRISTIAN, B.A. (Lond.), Headmaster of the Battersea Pupil Teachers' School, and G. COLLAR, B.A., B.Sc. (Lond.), Headmaster of the Stockwell Pupil Teachers' School. **Tenth Edition.** Crown 8vo, 552 pp. ... **4s. 6d.**

"It is not too much to prophesy that this reliable exposition of the principles of Arithmetic and carefully collated examples will become the leading text-book for P.T. Centres, Schools, and Colleges."
The Pupil Teacher and Scholarship Student.

THE ENGLISH LANGUAGE: Its Grammar, History, and Literature. By J. M. D. MEIKLEJOHN, M.A. **Twenty-fifth Edition. Enlarged, with Exercises and Additional Analysis.** Cr. 8vo, 486 pp. **4s. 6d.**

"I know of no book generally so suitable for an ordinary student."
Alfred Barriball, Esq., B.A., Westminster Training College.

THE ART OF WRITING ENGLISH. A Manual for Students. With Chapters on Paraphrasing, Essay Writing, Précis Writing, Punctuation, and other matters. By J. M. D. MEIKLEJOHN, M.A. **Fourth Edition.** Crown 8vo, 340 pp. ... ... **2s. 6d.**

"Every pupil teacher and every candidate for the teacher's certificate would do well to go through the course so ably and attractively set forth in its pages."

ONE HUNDRED SHORT ESSAYS IN OUTLINE. By Professor MEIKLEJOHN. **Sixth Edition.** Crown 8vo, 110 pp. ... ... **1s. 0d.**

"Two of the essentials to success in writing an essay are a full knowledge of the subject and a clear arrangement of the writer's ideas. This little work will supply a young student with the one, and help him to cultivate the other."
Cusack's Journal.

JUST PUBLISHED. ***Crown 8vo, 144 pp., 1s.***

Composition for Schools and Colleges.

BASED ON OUTLINE ESSAYS. WITH EXERCISES ON STYLE.

By C. H. MAXWELL, B.A.

The **subjects** of these outline essays have been chosen from a variety of sources, but nearly all of them have been set at different times in **various public examinations,** both those conducted by the Civil Service Commission and those for Pupil Teachers and other educational examinations.

Some **brief practical hints** stand at the beginning of the book: they comprise positive and negative suggestions as to what the essay-writer, to be successful, should endeavour to aim at, and what avoid. The outlines themselves are divided into six classes:—

Political and Social Essays.
Biographical and Historical Essays.
Essays on Abstract Subjects.
Essays on Out-of-door Subjects.
Essays on Literary Subjects.
Miscellaneous Essays.

To each class **a short introduction** suggesting a broad **method of treatment** is prefixed. In the case of certain essays, **sources of material** are indicated which should be referred to by the writer. The **exercises on style** at the end of the book will, it is hoped, be found helpful.

A Complete Catalogue will be sent on application.

MEIKLEJOHN & HOLDEN, 11 PATERNOSTER SQUARE, E.C.

OUR SCIENCE SECTION

☞ **Subscribers requiring Explanations of Difficulties in any branch of Science, or Advice upon Courses of Study, can obtain all help required by communicating with the Editor, and accompanying their query with the Coupon cut from this Number.**

CHEMISTRY.

(ADVANCED AND HONOURS.)

BY C. A. WEST, B.SC., A.R.C.S., F.I.C.

Synthesis of Hydroxylamine.—If a mixture of three volumes of hydrogen with a little more than two volumes of nitric oxide is passed slowly over spongy platinum heated at 115° to 120°, a mixture of hydroxylamine and ammonia is formed. If the temperature is allowed to rise too high, or if hydrogen is in excess, ammonia is the sole product, and in any case the yield of hydroxylamine is small.

Pure Silver from Silver Residues.—Pure silver for making silver nitrate may be conveniently obtained from laboratory silver residues in either of the following ways:—

1. Dissolve the residues in strong ammonia, distil off the excess of ammonia and precipitate the silver chloride with hydrochloric acid. Place the washed chloride in a porous cell with a quantity of dilute sulphuric acid, the cell being surrounded with dilute acid. Place a plate of amalgamated zinc in the acid outside the porous cell, and connect it by a platinum wire to a piece of platinum foil placed in the porous cell, and leave it for two or three days. Silver will be precipitated, and this, after washing with water, is ready for the preparation of silver nitrate.

2. Obtain silver chloride from the residues as above, wash it well, and place it in a platinum crucible, and immerse it in a basin of very dilute sulphuric acid. Place a piece of zinc in the basin, and allow it to rest against the side of the platinum crucible. Allow the action to go on for two or three days. Boil the finely divided silver which is formed with dilute sulphuric acid, and then well wash. The silver will then be ready for making silver nitrate.

Phosphorescent Sulphide of Strontium.—When pure precipitated strontium carbonate is treated with sulphur vapour in absence of oxygen, the strontium sulphide resulting is white and non-phosphorescent; but if the mineral strontianite is treated in the same way, the product is of a deep grey colour, and is highly phosphorescent. Other minerals containing strontium carbonate do not give such good results as strontianite. Temperature seems to have a great influence on the character of the product. If the preparation is carried out at a cherry-red heat, the product is non-phosphorescent. If a white heat is employed, the result is the same. A bright red heat is found to give the best results. The product formed at a white heat does not become phosphorescent when reheated.

Volumetric Analysis.—Julius Wagner, a few years ago, in the *Zeit. physikal. Chem.*, made some observations on the apparatus used in volumetric analysis, which are well worth notice. He tested the various methods of emptying pipettes, and found they were all capable of giving results accurate to 0·05 per cent. if care was taken to keep the time of outflow sufficiently great. The volumes of different solutions delivered by the pipette were practically the same. Measuring flasks can be used with a high degree of accuracy if care is taken to dry the neck above the mark.

All burettes require careful calibration, after which, for quantities above 20 c.c., the values are probably accurate to 0·05 per cent. Errors due to temperature variations are important: thus a change from 15° to 25°, if uncorrected, leads to errors of 0·2 to 0·3 per cent.

Detection of the Nitro Group.—All nitro compounds, when dissolved in dilute alcohol containing traces of some neutral salt, such as calcium chloride, are readily reduced by zinc dust to hydroxylamine derivatives. As a qualitative test, the reaction is best applied by dissolving three or four drops of the nitro compound in 3 c.c. of 50 per cent. alcohol, adding five or six drops of a 10 per cent. calcium chloride solution, and then heating until violent boiling begins. The mixture is then left for two to five minutes, filtered, and the filtrate tested with ammoniacal silver nitrate, the presence of a nitro compound being shown by the strong reducing power of the solution. Nitroso, azo, and azoxy derivatives give the reaction.

Nitrobenzene, in the presence of a little iron and hydrochloric acid, acts as an oxidising agent in the conversion of "aniline-red oil" (a mixture in equal parts of aniline and ortho- and para-toluidines) into rosaniline; and Lange has shown that any other nitro compound may be substituted for nitrobenzene in the reaction. Three or four drops of the nitro compound are boiled for two to three minutes in a test-tube with 2 c.c. of "aniline-red oil," 2 c.c. of distilled water, 2 c.c. of concentrated hydrochloric acid of sp. gr. 1·20, and 1 gram of iron filings, an excess of acid being carefully avoided, as it prevents the appearance of the colour. The red colour of the rosaniline is best observed by pouring a few drops of the dark-coloured liquid into dilute acetic acid. The "aniline-red oil" used should be nearly colourless. The coloration is not very marked with di- or trinitro compounds. In addition to nitro compounds, any substance containing oxygen directly attached to nitrogen—as, for example, azoxybenzene, nitrosobenzene, methylphenylnitrosamine, acetoxime, and ethylic nitrite or nitrate—gives the reaction.

Reaction for Methyl Alcohol.—A piece of light copper wire is wound into a close spiral about 2 cm. in length; it is superficially oxidised in the Bunsen flame, and, whilst still red-hot, is plunged into 3 c.c. of the liquid placed in a test-tube. A second dip is advisable, and with solutions containing less than 0·1 per cent. of methylic alcohol three or four additional dips are necessary, the tube being cooled after each. A concentrated spirit should always be diluted with at least three to four volumes of water before oxidation. The formic aldehyde produced is detected by the aid of a 0·5 per cent. aqueous solution of resorcinol. One drop of the solution is added to the oxidised methylic alcohol, and the mixture very cautiously poured down the side of a test-tube containing a few c.c. of concentrated sulphuric acid, the presence of methylic alcohol in the suspected liquid being indicated by the appearance of a pure rose-red zone at the junction of the two liquids. Too large a quantity of resorcinol is to be avoided, as it tends to destroy the purity of the rose colour. Other substances which give similar colorations are secondary and tertiary butylic alcohols, dimethylethylcarbinol, formic acid, and most methylic salts and ethers. The colour with formic acid is extremely feeble. Other monohydric alcohols give ochreous yellow, and polyhydric alcohols give brownish-purple colorations.

Crystals in the Leclanche Cell.—The composition of the crystals formed in the Leclanche cell has been the subject of considerable dispute. It appears now to be established that the composition is $ZnCl_2, 2NH_3$, as it has been shown that the crystals are crystallographically identical with those of this composition obtained in other ways.

Metallic Permanganates.—The metallic permanganates, which are not readily obtained from potassium permanganate by double decomposition, may be prepared electrolytically. A closed electrolytic cell, with suitable diaphragm, and provided with tubes for the escape of gases, is employed. In the preparation of calcium permanganate, for instance, the cathode cell contains a dilute solution of potassium hydroxide. The anode cell contains potassium permanganate solution, kept saturated by suspended baskets of the salt. During the electrolysis, lime is added to this cell from time to time in the form of a cream. Hydrogen is evolved at the cathode and oxygen at the anode, the permanganic acid formed combining with the lime. After a time, the calcium and potassium permanganates remaining are separated by crystallisation. Calcium chloride may be used in place of lime, in which case the cathode cell is filled with a saturated solution of potassium chloride.

Course "B" Arithmetics

Teachers taking up Course "B" in Arithmetic should examine the best books available for their scholars' use. Messrs. Blackie's three series meet every requirement, and are being adopted in large numbers of the leading schools. Full particulars may be had from Messrs. Blackie & Son, Ltd., 50 Old Bailey, London.

Scheme "B" Arithmetics. No better books for Scheme "B" are obtainable than **Blackie's Arithmetics for Course "B,"** in seven numbers, at prices ranging from 2d. to 3½d. The books are the work of leading educationists, and are of real merit. They possess the great advantage of ample mental exercises *in the pupils' books.* London teachers will be glad to know that the series has been adopted by the Education Committee.

✢ ✢ ✢ ✢

Scheme "B" Problems. To accompany the above, Messrs. Blackie have issued a set of **Course "B" Practical Problems in Arithmetic.** The exercises throughout are printed in clear type, and the series has many noteworthy features, such as (1) The "practical" character of the tests—all transactions within the child's experience; (2) the classification of the sums into "type forms"—simpler type forms attacked first; (3) the grading of the sums in each type; (4) the systematised mental questions which precede each type; (5) worked examples of each type are given; (6) easy words only are used in Stand. I. and II.

✢ ✢ ✢ ✢

Scheme "B" Tests. Another highly useful series of Exercises based on Scheme "B" is issued under the title of **Blackie's Arithmetical Tests for Scheme "B."** These labour-saving little books, seven in number, are issued at the remarkably low price of one penny each. They have won their way into so very many schools that a description of them at this time is hardly needful, but any head teacher taking up Scheme "B" should make a point of examining them as well as the foregoing series before deciding on a new set for use in school.

FROM **GINN & COMPANY'S LIST**

An Illustrated School Geography

Revised Edition. 1904.

By A. J. HERBERTSON, F.R.G.S. Eng., and ALEXIS FRYE, First Superintendent of Schools in Cuba.

Contains nearly seven hundred illustrations and diagrams; about fifty outline and relief maps, and sixteen pages of coloured maps.

Large quarto, 12 by 10 inches. Price 5s.

Journal of Education.—"Well worth the careful attention of all teachers of geography."

First Studies of Plant Life.

By G. F. ATKINSON, Ph.B., Professor of Botany in Cornell University.

Brings the life processes of plants within reach of the child as living beings with needs like his own. Eight full-page and three hundred smaller illustrations.

266 pages. Price 2s. 6d.

Nature Study Journal.—"One of the best Nature study books we have come across dealing with plant life."

Short Stories from English History

By ALBERT F. BLAISDELL, M.D.

Contains a series of some forty dramatic and notable events in English History from the earliest times to the present, carefully compiled and rewritten from standard works and well-known authors, and is intended to serve as a supplementary reader for boys and girls from about nine to twelve years of age.

Cloth. 191 pages. Illustrated. Price 2s.

Ten Boys who lived on the Road from Long Ago to Now.

By JANE ANDREWS.

The History of the World, summarized in the story of Kablu, the Aryan boy; Darius, the Persian boy; Cleon, the Greek boy; Horatius, the Roman boy; Wulf, the Saxon boy; Gilbert, the Knight's page; Roger, the English boy; Fuller, the Puritan boy; Dawson, the Yankee boy; and the boy of to-day.

Cloth. 249 pages. Illustrated. 2s.

Lists post free on application. *Books sent on approval to teachers.*

GINN & COMPANY, ST. MARTIN'S STREET, LONDON, W.C.

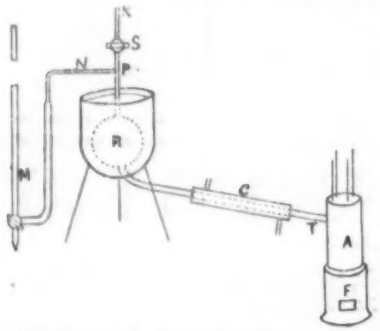
PHYSIOGRAPHY.

(STAGES 2 AND 3.)

VAPOUR PRESSURES.

(Continued.)

THE apparatus which Regnault used for determining the pressure of aqueous vapour for temperatures above 50° C. was quite different from that which he used for temperatures below that point. The apparatus for higher temperatures depended for its action upon the fact that the pressure exerted by the vapour issuing from boiling water is the same as the external pressure. To make use of this principle, the apparatus shown in the figure was constructed. A is a copper boiler supported on a furnace F, so that its temperature can be raised. The boiler contains water, into which two delicate thermometers dip, so that the temperature can easily be ascertained. Two also are immersed in the steam. A copper tube T runs upwards from the boiler in a slanting direction, and is surrounded by a condenser tube C, through which a supply of cold water flows. By this means the vapour escaping from the boiler by the tube is condensed, and returned to the boiler as water. This enables the boiling to be long continued without appreciably decreasing the amount of water in the boiler. After passing through the condenser jacket the tube T is connected to the lower end of a capacious air reservoir R. From the upper portion of the reservoir a tube emerges. This tube is branched at P. One branch PK communicates with an air-pump, so that the pressure of the air in the reservoir R can be increased or decreased at will. The branch PN communicates with a mercury manometer M, which gives a direct reading of the pressure in terms of the length of a mercury column. The reservoir R is immersed in water at the temperature of the surrounding air to keep its temperature



constant. Regnault used this apparatus for pressures up to five atmospheres. To obtain a series of readings, the water in A is heated and the air pumped from R until the water boils at 50° C., as shown on the thermometers. The fact that the water is boiling is evidenced by the sound produced, and also by the fact that the thermometers give a constant reading. The latter fact is one of the chief advantages of this method, for so long as the pressure is kept constant, the boiling-point remains constant, and so the thermometers acquire exactly the temperature of the water, and correct readings are possible. The pressure indicated by the manometer is, of course, equal to the pressure exerted by the vapour, and is the maximum vapour pressure for this temperature. By letting more air into the reservoir R the pressure is increased, and the vapour pressure consequently must increase and the temperature in the boiler A rise. A new equilibrium is soon established, and the thermometers again become steady, and we can read off on the manometer the new vapour pressure corresponding to the new temperature. In this way a series of readings up to about 100° C. can be obtained. The pressure corresponding to this temperature is 760 mm. of mercury. For higher temperatures and pressures, air must be forced into the reservoir by a pump. With an apparatus similar to the one just described, but with alterations in the dimensions, so as to strengthen it, Regnault obtained pressures up to twenty-eight atmospheres, and ascertained the corresponding temperatures. Dulong and Arago made a series of determinations of the vapour pressures of water at various temperatures, and their results agreed very closely with those of Regnault.

In such experiments as those described, numerous corrections have to be made before the results can be regarded as approaching to absolute accuracy. In reading the pressure, for instance, this is read in terms of the height of a column of mercury. For pressures below that of the external atmosphere, the pressure determined directly would be the height of the barometer, minus the difference in height of the two mercury columns in the manometer. For pressures above atmospheric, the readings would be the height of the barometer plus the difference in these two heights.

Now, the pressure per square centimetre exerted by a column of mercury of given height depends upon the density of the mercury and upon the force of gravity. Both these factors vary. The density of the mercury varies very considerably with the temperature, and the force of gravity varies with the position on the earth's surface. In addition, errors creep in due to defects in the apparatus and the methods employed, and defects due to the observer. The same observer using the same apparatus and under the same conditions, as nearly as they can be obtained, at different times will obtain different results. The results will vary, it is true, within narrow limits. Some of these errors, but not all, can be easily corrected for, and in perfecting his apparatus and methods, and in applying all possible corrections, Regnault exhibited remarkable ingenuity. He not only applied his corrections to his own results, but he also closely studied the experiments of his predecessors, discovered many of their sources of error, and applying the necessary corrections, showed that their results then agreed very closely with his own. Let us consider Regnault's method in the present case. Having obtained a considerable number of readings for the pressure at a temperature of 50° C., he would then group them and deduce from them what was the most probable result. He would treat the observations at other temperatures in the same way, and thus obtain a series of values as nearly correct as he could make them, treating them separately. In order to compare these values with each other, he constructed a curve in the following way A horizontal line, or abscissa, was divided into a number of equal divisions, representing degrees on an arbitrary scale. At each division was drawn a vertical line or ordinate, of such a length as to represent on another arbitrary scale the corresponding pressure. The ends of these lines were then joined by a line drawn through them all. This line was very nearly a regular curve, but it contained a considerable number of small irregularities.

These irregularities were no doubt due to the errors of experiment, and a nearer approach to accuracy would be obtained by drawing a regular curve half-way between the points of the lines, leaving as many points below as above. This line Regnault took as representing as nearly as could be obtained the connection between the temperatures and the corresponding vapour pressures. We will not go into detail here with regard to the corrections to be applied when deducing the pressure from the heights of the mercury columns. These we will defer until next month, when we shall consider the corrections to be applied to barometric readings.

Regnault, after dealing with aqueous vapour, also determined with the same kind of apparatus the vapour pressures of a few other liquids, and the following table gives some of his results. The corresponding figures for water are given, so that a comparison can readily be made.

Vapour Pressures in mm. of Mercury.

Temp. (C.)	Water.	Alcohol.	Ether.	Carbon Disulphide.
– 20	·927	3·34	68·90	47·30
– 10	2·093	6·47	114·72	79·44
0	4·6	12·7	184·39	127·91
10	9·165	24·23	286·83	198·46
35	41·827	102·91	761·20	519·66
60	148·79	350·21	1725·01	1164·51
75	288·517	665·54	2645·41	1779·88
90	525·45	1189·30	3898·26	2619·08
100	760·00	1697·55	4953·30	3325·15
120	1491·28	3231·73	7719·20	5148·79

Dalton believed that the pressures of the vapours of all liquids would be equal at an equal number of degrees below their boiling-points. For example, water boils at 100° C. and alcohol at 78° C. If Dalton's opinion were correct, then the vapour pressure of water at 92° C. should be the same as that of alcohol at 70° C. The actual figures are 566·7 mm. and 541·1 mm. of mercury respectively. This and other examples show that Dalton's hypothesis is not generally true, although it seems to be approximately true for temperatures only a few degrees above or below the boiling-points. No simple law has yet been discovered connecting the various vapour pressures of a substance with the corresponding temperatures.

"Here's the book I sought for so."—JULIUS CÆSAR, IV. iii. 250.

Messrs. Methuen are now publishing many New Educational Books. Please write for their New Educational Lists and for specimens of any books you are thinking of adopting.

MATHEMATICS

Easy Exercises in Arithmetic. By W. S. BEARD. Fcap. 8vo, cloth. With Answers, 1s. 3d. Without Answers, 1s.
Contains 5,000 well-graduated original examples, of which half are concrete, for pupils under thirteen. The book is beautifully printed on good paper, and strongly bound in cloth.
☞ *Please write for a Specimen Copy.*

A Junior Geometry. By NOEL S. LYDON, Owen's School, Islington. With 239 Diagrams and numerous Exercises. 2s.
"A good course. The exercises are plentiful and well chosen, especially the graphical ones."—*Journal of Education.*

Geometry on Modern Lines. An Elementary Text-book. By E. S. BOULTON, M.A. Crown 8vo. 2s.
"A short, concise, well-printed account of the elements, in which propositions are cut down to the minimum, and the beginner is not burdened with anything beyond the central facts."—*Guardian.*

Junior Algebra Examination Papers. By S. W. FINN, M.A. With or without Answers. Fcap. 8vo. 1s.

Junior Arithmetic Examination Papers. By W. S. BEARD. With or without Answers. 1s.

Technical Arithmetic and Geometry. By C. T. MILLIS, M.I.M.E., Principal of the Borough Polytechnic Institute. With 154 Diagrams. Crown 8vo. 3s. 6d.
"By a careful study of the new work the reader will be placed in a position to derive full benefit in the shortest possible time from the more technical portion of his training."—*Educational Times.*

MODERN LANGUAGES

A Junior French Grammar. By L. A. SORNET and M. J. ACATOS, Modern Language Masters at King Edward's School, Birmingham. Crown 8vo. 2s.
A complete grammar and exercise book in one volume.

Junior German Examination Papers. By A. VOEGELIN, M.A., Assistant Master at St. Paul's School. Fcap 8vo. 1s.

HISTORY AND GEOGRAPHY

The Ancient World. By E. M. WILMOT-BUXTON, Assistant Mistress Brighton and Hove High School, Author of "Makers of Europe." With Maps and Illustrations. Crown 8vo. 3s. 6d.
This book tells the story of the great civilisations of the Ancient World, as made known by recent excavation and discovery, from the dawn of Egyptian history to the days of the Roman Empire.

Junior Geography Examination Papers. By W. G. BAKER, M.A. Fcap. 8vo. 1s.

A Historical Geography of the British Empire. By H. B. GEORGE, M.A., Fellow of New College, Oxford. Crown 8vo. 3s. 6d.

The Story of the British Empire for Children. By F. M. ANDERSON. With many Illustrations. Crown 8vo. 2s.
This is not a text-book but the story, told simply, of the British Empire. The book's aim is to present to the minds of young Britons all over the world a clear and definite picture of their great heritage.

SCIENCE

Elementary Experimental Science.—PHYSICS, by W. T. CLOUGH, A.R.C.S.; CHEMISTRY, by A. E. DUNSTAN, B.Sc., Assistant Masters at Owen's School, Islington. With 2 Plates and 154 Diagrams. Crown 8vo. 2s. 6d.

Practical Chemistry. Part I. By W. FRENCH, M.A., Director of Education and Principal of the Storey Institute, Lancaster. With 57 Diagrams. *Second Edition, Revised.* Crown 8vo, 1s. 6d.
Part II. By W. FRENCH, M.A., and T. H. BOARDMAN, M.A., Science Master at Christ's Hospital. With 56 Diagrams. Crown 8vo. 1s. 6d.

Junior General Information Examination Papers. By W. S. BEARD. Fcap. 8vo. 1s.

METHUEN & CO., 36 Essex Street, LONDON, W.C.

A NEW SERIES FOR INFANTS.

The Royal KING Infant Series

Introductory to Nelson's Royal "Prince" and "Princess" Readers.

Beautifully Illustrated in Colour.

Royal King Primer I.	...	...	...	3d.
Royal King Primer II.	...	...	...	4d.
Royal King Infant Reader I.	...	...	...	5d.
Royal King Infant Reader II.	...	...	...	6d.
Royal King Infant Reader III.	...	...	...	7d.

These charming little books are set in a large, new type, to avoid strain on the children's eyes, and the pictures have been specially designed for this series.

THOMAS NELSON AND SONS,
35 and 36 Paternoster Row, London, E.C.; Parkside, Edinburgh; and New York.

NOW READY. **Price 3d.; post free, 4d.**

The Practical Teacher's ART MONTHLY

For OCTOBER.

Large Supplement: "Nature Study in October."

CONTENTS.

PAINTERS, ENGRAVERS, AND ENGRAVINGS. By W. E. SPARKES.
THE BERNE INTERNATIONAL CONGRESS.
DRAWING IN INFANT SCHOOLS.
MORE ANIMAL STUDIES FOR SCHOOLS.
EDITORIAL NOTES.
EDUCATIONAL HANDWORK ASSOCIATION.
A FURTHER COURSE OF CLAY MODELLING. By Miss HERMIONE UNWIN.
TOOLS, AND HOW TO USE THEM. By F. BUSH, Leeds, City and Guilds Medallist.
BRUSH DRAWING FOR THE SENIORS.
THE MAY EXAMINATIONS, 1905.

Order from your Bookseller now, or send to
"The Practical Teacher" Office,
Messrs. T. NELSON AND SONS,
35 and 36 Paternoster Row, London, E.C.

THEORETICAL MECHANICS.

Stages 2 and 3, and Intermediate Science, London University.

BY FRANK CASTLE, M.I.M.E.,

Royal College of Science; Lecturer on Mechanics, etc., Morley College, London; Author of "Elementary Practical Physics," "Practical Mathematics," etc.

Conditions of Equilibrium.—It may be advisable to briefly summarise the more important points already referred to. Thus, in the case of a system of forces acting at a point, the magnitude and direction of the resultant is given by the line joining the initial to the final point of the polygon of forces; or, analytically, if X denotes the algebraic sum of the horizontal, and Y the sum of the vertical components, then the resultant is given by $R = \sqrt{X^2 + Y^2}$. Its direction is obtained from $\tan\theta = \frac{Y}{X}$.

When the initial and final points coincide, the given forces have no resultant and are in equilibrium, the horizontal components balance $\therefore X = 0$, and the vertical components balance, or $Y = 0$. These two conditions are equivalent to the graphical condition that the force polygon is closed.

In the preceding the position of the resultant is known, and it is only necessary to determine its magnitude and direction.

In the case of a system of forces which do not act at a point, the position or point of application of the resultant must be found, in addition to its magnitude and direction. The position is determined by drawing a *link* or *funicular* polygon, and the magnitude and direction by a force polygon. The graphical conditions of equilibrium are that the force and link polygons are closed figures.

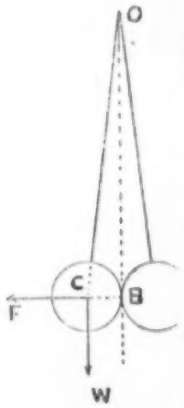
The analytical conditions may be stated as follows:—The sum of the moments of a system of forces about any point in the plane is equal to the moment of their resultant about that point.

If the co-ordinates of the point are x, y, then the conditions of equilibrium become $X = 0$, $Y = 0$, and $Yx - Xy = 0$. It should be noticed that the first two conditions $X = 0$, $Y = 0$ are not sufficient to ensure equilibrium; unless the latter is also true, the system of forces reduces to a *couple*.

A simple and illustrative case occurs in two equal "unlike" vertical forces, in which obviously $X = 0$ and $Y = 0$. The given forces reduce to a couple, the magnitude of which is the product of one of the forces and the perpendicular distance between them.

Ex. 1. Two frictionless balls of equal weight W and equal radius a are suspended from the same point by threads of equal length l, so as to rest in contact. Prove that the lines of the threads pass through the centres of the balls, and that the balls press each other with a force $\frac{Wa}{(l^2 + 2al)^{\frac{1}{2}}}$.

(B.A. 1899.)



The force pressing the balls together will be the same as the horizontal force F necessary to displace one of the balls of weight W through a distance a. The three forces acting on the ball are its weight W, the force F, and the tension T of the thread. As one of these acts at the centre of gravity (C) of the ball, the remaining two must pass through the same point, hence the lines of the threads pass through the centres of the balls.

A triangle in which the three sides are parallel to the directions of W, F, and T, and the vertical side equal in magnitude to W, will give the magnitudes of F and T.

If we assume OB to represent W, then to the same scale BC will represent F, and OC will represent T.

$$\text{Hence } F = W\tan BOC = W.\frac{BC}{OB}.$$

$$\text{As } OC = l + a \text{ and } CB = a$$

$$\therefore OB = \sqrt{(l+a)^2 - a^2} = \sqrt{l^2 + 2al}$$

$$\therefore F = \frac{Wa}{\sqrt{l^2 + 2al}}$$

Ex. 2. State and prove the conditions of equilibrium of three parallel forces. Show in a diagram the forces which act on a book held out horizontally between a finger and a thumb.

A sculling boat is propelled by two sculls each 9 feet long and 6 feet from the rowlock to the blade, and the sculler pulls each hand with a force of 20 lbs. Prove that the thrust on each rowlock is 30 lbs., but the propulsive force on the boat is 20 lbs., and that the boat moves about double as fast as the hands pull.

Estimate the horse-power exerted at 8 miles per hour.

(Inter. Sci., 1901.)

Let W denote the weight of the book acting through the centre of gravity G, also let the line joining the points where the finger and thumb are applied be at a distance a from G; then at A there is a force equal to W, and a couple $W \times a$.

Let B denote the position of the rowlock; then taking moments about B, the thrust T at the end of the scull is given by

$$T \times 6 = 20 \times 3. \quad \therefore T = 10 \text{ lbs.}$$

As there are two sculls, the propulsive force on the boat is $2 \times 10 = 20$ lbs. The pull on the scull and the thrust on the water constitute two like parallel forces, and the thrust on the rowlock is the sum = 30 lbs.

The point C moves at twice the speed of A; hence, neglecting slip, the boat moves about double as fast as the hands pull.

$$8 \text{ miles per hour} = \frac{8 \times 5280}{60} = 8 \times 88 \text{ ft. per min.}$$

$$\therefore \text{horse-power} = \frac{8 \times 88 \times 20}{33000} = 0{\cdot}426.$$

Ex. 3. Determine the condition of equilibrium of a lever and give some familiar illustrations.

An eight-oar boat with oars 12 feet 6 inches long, and divided by the rowlock at 3 feet 6 inches from the handle, is propelled at 12 miles an hour by each man pulling with a force of 18 lbs. Determine the resistance of the water and the horse-power exerted by each man, supposing the forward swing of the bodies to keep up the way between the strokes. (Inter. Sci., 1902.)

Let T denote the force exerted on the water at the end of the oar; then $T \times 9 = 18 \times 3{\cdot}5$.

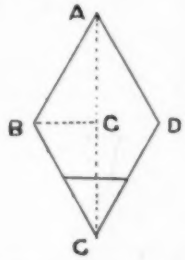
$$\therefore T = 7 \text{ lbs.}$$

As there are 8 oars, the resistance of the water is $8 \times 7 = 56$ lbs.

$$12 \text{ miles per hour} = \frac{12 \times 5280}{60} \text{ ft. per min.}$$

$$\therefore \text{horse-power} = \frac{12 \times 5280 \times 7}{60 \times 33000} = 0{\cdot}224.$$

Ex. 4. Four uniform rods, each of length a and weight W, are pivoted together, so as to form a rhombus ABCD, which is suspended from one corner A. The rhombus is prevented from collapsing by a light rod of length l, whose ends are fastened to the middle points of BC and CD. Find the magnitude and direction of the stress at the point A. (B.Sc. 1895.)



Let P denote the stress in AB and AD, and θ the angles BAC and DAC.

Join B to the middle point of AC; then $BG = l$.

The forces acting at A are 4W vertical, a stress P in AB, and an equal stress P in AD. The vertical forces 4W must be balanced by the vertical components of the stresses in AB and AD.

$$\therefore P\cos BAC + P\cos DAC = 4W$$

$$\therefore 2P\cos\theta = 4W \quad \ldots\ldots\ldots (1)$$

$$\cos\theta = \frac{AG}{AB} = \frac{\sqrt{a^2 - l^2}}{a}.$$

Substituting this value in (1) we obtain

$$\frac{2P\sqrt{a^2 - l^2}}{a} = 4W$$

$$\therefore P = \frac{4aW}{\sqrt{a^2 - l^2}}.$$

OXFORD UNIVERSITY PRESS.

OXFORD MODERN FRENCH SERIES.

Edited by LEON DELBOS, M.A. Crown 8vo, cloth.

DEUX HÉROÏNES de la RÉVOLUTION FRANÇAISE.

By LAMARTINE. Edited by MARY BENTINCK-SMITH. 192 pages, 2s. 6d.

La VENDETTA and PIERRE GRASSOU.

By BALZAC. Edited by MARIE PECHINET, B.A. 140 pages, 2s.

BUG-JARGAL.

By VICTOR HUGO. Edited by LOUIS SERS. 152 pages. 2s.

MADEMOISELLE de la SEIGLIÈRE.

By SANDEAU. Edited by A. L. DUPUIS. 214 pages, 2s. 6d.

MÉMOIRES d'OUTRE-TOMBE.

By CHATEAUBRIAND. Edited by LOUIS SERS. 164 pages, 2s. 6d.

VOYAGE AUTOUR de MON JARDIN.

By KARR. Edited by STUART G. HALLAM, M.A. 148 pages, 2s

Le CHÂTEAU de VAUX.

By GOZLAN. Edited by A. H. SMITH, M.A. 92 pages, 1s. 6d.

EXTRAITS des VOYAGES d'ALEXIS de TOCQUEVILLE.

Edited by J. MANSION. 122 pages, 2s.

THE PREPARATION OF THE CHILD FOR SCIENCE. By M. E. BOOLE. Crown 8vo, cloth, 2s.; or interleaved with writing-paper, 3s.

EXERCISES IN LATIN PROSE, WITH VOCABULARY. By G. G. RAMSAY, LL.D., Litt.D. Newly arranged in Three Parts. Crown 8vo, cloth. Part I., Lower Grade, 1s. 6d. Part II., Higher Grade, 1s. 6d. Part III., Syntax and Appendix, 2s. 6d.

EXPERIMENTAL AND THEORETICAL COURSE OF GEOMETRY, with or without Answers. By A. T. WARREN, M.A. Second Edition, thoroughly revised, with many new propositions and figures, crown 8vo, cloth, 2s.

SCHOOL HISTORY OF ENGLAND to the Death of Victoria. With Maps, Plans, and select Bibliographies. By O. M. EDWARDS, R. S. RAIT, and others. Crown 8vo, cloth, 3s. 6d.

Also published by HENRY FROWDE.

THE FLORIN SERIES OF

STANDARD OXFORD EDITIONS OF POETRY AND PROSE.

Crown 8vo, bound in cloth, gilt lettered on side and back, price 2s. per volume; or, in leather bindings, from 3s. 6d. Well printed in the largest possible type compatible with the length of the work, on good paper, and are tastefully and strongly bound. Each book contains a portrait of the author or other illustrations.

LIST OF THE VOLUMES.

Shakespeare—Bunyan's Pilgrim's Progress (Cruikshank's Illustrations)—Boswell's Johnson (2 Vols.)—E. B. Browning—Burns—Byron—Longfellow—Milton—Scott—Early Poems of Tennyson—Whittier—Wordsworth.

This series may also be had printed on Oxford India paper from 5s.

London: HENRY FROWDE, Oxford University Press, Amen Corner.

NATURE STUDY IN SCHOOLS.

BOTANY READING BOOKS.

By the late Rev. A. JOHNSON, M.A., F.L.S., Headmaster of St. Olave's Grammar School.

These books, though intended for use in the Upper Standards of Elementary Schools, will be found very useful introductions to the study of Botany in the Middle Class and Higher Schools.

PART I. Vegetable Life, illustrated from Plants easily met with. The more permanent organs. Illustrated. 130 pages. Price 1s.

PART II. The Different Orders. Distribution of Plants. Anatomy and Physiology of Plants. With 25 pages of Plates. 232 pages. Price 1s. 8d.

"Complete in itself, and forming what may be called a Botanical Primer, the lessons, instead of being thrown into a formal, didactic shape, are presented in the form of conversations. To set the matter clearly before the mind of the reader the publishers have supplied plenty of suitable illustrations, while the teachers are strongly recommended to procure natural specimens of the different plants and flowers alluded to in the book."—*Educational Times* (on Part I. of the above).

CHAPTERS IN POPULAR NATURAL HISTORY.

Being an Advanced Reading Book for use in Elementary and Higher Schools.

By the Right Hon. LORD AVEBURY, F.R.S., Author of "Ants, Bees, and Wasps," etc.

With 90 Illustrations. 224 pages. Price 1s. 6d.

The above Work in handsome binding, gilt edges, price 2s.

"It has been admirably condensed from his larger works on insects and wild flowers, and will excite the wonder of young readers by the insight it gives them into the mysteries of nature and science....There is abundance to charm all classes of students, and to set them thinking."—*Daily Chronicle.*

N.B.—Specimen pages of the above Books will be sent to Head-Teachers on application.

NATIONAL SOCIETY'S DEPOSITORY,
SANCTUARY, WESTMINSTER, S.W.

GIBSON'S PHONIC READERS.

THE System adopted in this series of **Readers** is the **PHONETIC.** The aim is to simplify the process, and to make the acquirement of Reading more attractive and progressive, by using only those words which admit of phonetic analysis, and by careful gradation of difficulties.

Exceptional words are introduced by degrees, and are taught by the **"Look and Say"** method.

To avoid unnecessary detail, which is confusing and irritating alike to pupil and teacher, **one sound only** of a letter or combination of letters is taught in the early stages.

As the chief difficulty of the system lies in the power of the vowel sound, the greater part of the first Reader is built on the short vowel, so that the child may become familiar with one series of words before proceeding to another.

Colour has been introduced to brighten otherwise dull lists of words, and as an aid in maintaining attention.

Part I.—Paper, 2d.; Cloth, 3d.
II.—Paper, 4d.; Cloth, 5d.
III.—Cloth, 7d.
Phonic Word-building Practice Sheets, 7s. 6d. per Set.

When pupils have thoroughly mastered the above Series, they are able to read **at sight** any book of average difficulty.

ROBERT GIBSON & SONS (Glasgow), Ltd.,
45 QUEEN STREET, GLASGOW.

OUR QUERY COLUMN.

RULES.

1. Each correspondent is restricted to *one* question.
2. Each query must be accompanied by the name and address of the correspondent, and the *coupon* which appears on the back wrapper of the current number of the Journal.
3. CORRESPONDENTS MUST IN ALL CASES STATE THE SOURCE FROM WHICH THEIR QUERY HAS BEEN OBTAINED.

The Editor reserves to himself the right to decline to answer any question which is, in his judgment, unsuited to the Magazine.

Bike. — A uniform sphere of mass m is on a perfectly rough inclined plane, and a light string is fastened at one end to that point of the sphere which is farthest from the plane, and passes over a smooth pulley which is such that the portion of the string between the sphere and the pulley is parallel to the line of greatest slope of the plane. The string has a weight of mass M hanging vertically at its other end. If the sphere be projected with a velocity V down the plane, show that if $2M > m \sin \alpha$ it will come to rest when it has rolled a distance

$$\frac{4M + \frac{7}{2}m}{2M - m \sin \alpha} \cdot \frac{V^2}{2g}$$

down the plane, α denoting the inclination of the plane.

(London B.Sc., 1905.)

Let l denote the length of the straight line described by the centre of the sphere before it comes to rest. Then since at every instant the point of the sphere which is farthest from the plane is moving twice as fast as the centre, $2l$ will be the length of string drawn up. Again, since V is the velocity of the centre, the velocity of any point of the string will be 2V.

Now at the instant of projection the kinetic energy of the system is made up of two parts—(1) the kinetic energy of the sphere due to its rotation about a tangent at right angles to the line of greatest slope of the plane, and (2) the kinetic energy due to the motion of the suspended weight vertically upwards.

The moment of inertia of the sphere about a tangent being $m(\frac{2}{5}r^2 + r^2)$ or $\frac{7}{5}mr^2$, (1) is given by $\frac{7}{10}mr^2 \cdot \frac{\omega^2}{2}$, where ω, the angular velocity of the sphere, is equal to $\frac{V}{r}$.

Hence (1) is given by $\frac{7}{10}m \cdot \frac{V^2}{2}$.

Again, (2) is given by $M\frac{(2V)^2}{2}$. Therefore the kinetic energy of the system at the moment of projection—that is, the sum of (1) and (2)—is equal to $(4M + \frac{7}{5}m)\frac{V^2}{2}$.

Now the work done by gravity on the sphere is equal to $mgl \sin \alpha$, and the work done against gravity in raising the suspended weight through the length $2l$ vertically is equal to $Mg(2l)$. Therefore the work done against gravity by the system before it comes to rest is equal to $2Mlg - ml \sin \alpha g$.

But this amount of work is equivalent to the kinetic energy of the system at the instant of projection.

Therefore $l(2M - m \sin \alpha)g = (4M + \frac{7}{5}m)\frac{V^2}{2}$.

Therefore $l = \frac{(4M + \frac{7}{5}m)}{2M - m \sin \alpha} \cdot \frac{V^2}{2g}$.

Whitehall.—We should think Bernard and Child's *Modern Geometry* would suit you. We have not seen the work you mention.

Fern.—Assuming that sound travels at the rate of 1,100 feet per second, and that a man walking towards a gun fired once a minute hears the fourteenth report $12\frac{2}{13}$ minutes after hearing the first, find the rate in miles per hour at which the man is walking. (Cambridge Senior Arithmetic, 1895.)

Let A denote the position of the man when he heard the first report, and B his position when the fourteenth report reached him. A person stationed at A would hear the fourteenth report 13 minutes after hearing the first. Hence the sound travels from B to A in $(13 - 12\frac{2}{13})$ minutes, or $\frac{3}{13}$ of a minute. The distance of B from A is therefore $1100 \times \frac{3}{13} \times 60$ feet.

Now the man walks from A to B in $12\frac{2}{13}$ minutes. Hence his rate of walking is $1100 \times \frac{3}{13} \times 60$ feet per $12\frac{2}{13}$ minutes; that is, $1100 \times \frac{3}{13} \times 60 \div \frac{157}{13}$ feet per minute; that is, $\frac{1100 \times 2 \times 60}{375 \times 1760 \times 3} \times 60$ miles per hour; that is, 4 miles per hour.

Rogo.—The greatest common factor of two numbers is 35; their least common multiple is 1260. If neither number is a multiple of the other, find them both.

Let M and N denote the two numbers. Then by the question we have $M = 35x$, and $N = 35y$.

Also $35xy = 1260$. Hence $xy = 36$.

Now, since neither of the numbers M and N is a multiple of the other, it follows that x and y do not contain a common factor. Hence x and y must be 9 and 4.

The two numbers are therefore 35×9 and 35×4—that is, 315 and 140.

Pierre.—An alloy containing seven times as much gold as silver is worth three times as much as one that contains three times as much silver as gold. In what proportion must these alloys be mixed to form one worth £2, 10s. an ounce, gold being worth £3, 17s. 11d. an ounce?

8 ounces of the first alloy consist of 7 ounces of gold and 1 ounce of silver.

8 ounces of the second alloy consist of 2 ounces of gold and 6 ounces of silver.

And by the question 8 ounces of the first alloy are worth as much as 24 ounces of the second; therefore 7 ounces of gold and 1 ounce of silver are worth as much as 6 ounces of gold and 18 ounces of silver.

Hence it follows that 1 ounce of gold is worth as much as 17 ounces of silver.

By the question 1 ounce of gold is worth £3, 17s. 11d.; therefore 1 ounce of silver is worth £3, 17s. 11d. ÷ 17—that is, 4s. 7d.

The first alloy is therefore worth {7 × £3, 17s. 11d. + 4s. 7d.} ÷ 8 per ounce—that is, 825 pence per ounce.

The second alloy is worth {£3, 17s. 11d. + 3 × 4s. 7d.} ÷ 4—that is, 275 pence per ounce.

The question therefore is—How much of an alloy worth 825 pence per ounce must be mixed with an alloy worth 275 pence per ounce in order to produce an alloy worth 600 pence per ounce?

CHAMBERS'S
NEW SCHOOL BOOKS.

A School Geometry on New and Original Lines.

Elementary Pure Geometry
With Mensuration.

By E. BUDDEN, M.A. Oxon., B.Sc. Lond.,
Macclesfield Grammar School, formerly Scholar of Winchester College and of New College, Oxford.

Part I., with or without Answers, 96 pages, 10d.
Parts I. and II. together, 200 pages, 2s.
Parts I., II., and III. (forming the complete book), 292 pages, 3s.

CONTENTS.—Part I. Triangle, Circle (part), Congruent and Similar Figures (Euclid I., VI. 2–18, parts of III., IV.).
Part II. The Circle (Euclid III., IV.), Mensuration (Euclid II., VI. 1, 10, etc.), Trigonometry.
Part III. Modern Geometry, Conics, Solid Geometry.

Plane Geometry Practical and Theoretical

A School Geometry on the New Lines.

By J. S. MACKAY, M.A., LL.D.

Books I., II., III. (corresponding to Euclid's *Elements*, I.–IV.). 244 pages. 2s. 6d.

Book I. separately. 128 pages. 1s.

Chambers's Arithmetical Examples.

Edited by
W. WALLACE DUNLOP, M.A.,
Head Master of Daniel Stewart's College, Edinburgh;
and
W. WOODBURN,
Author of "Chambers's Commercial Arithmetic."

208 pages. 1s.
With Answers, 1s. 6d.

This volume, consisting entirely of exercises, is eminently suited for use in all classes of Schools.

Also in Parts. I., II., and III., paper, 2d. each; cl., 3d. each. IV. and V., paper, 4d. each; cloth, 5d. each.

Chambers's Elementary German Grammar.

By CARL EDUARD AUE, Ph.D.

Entirely New Edition by OTTO SCHLAPP, Ph.D.,
Lecturer on German at the University of Edinburgh.

224 pages. Price 2s.

Chambers's Latin Dictionary.

Latin-English and English-Latin.

816 pages. 2s. net.

An exact reprint of the original work issued at 6s., and an admirable dictionary for school use and for general purposes.

Chambers's Advanced History of England.

288 pages. Price 1s. 6d.

This volume, intended for use in the Senior Classes, deals in an interesting and attractive manner with the Social and Political History of our country from the earliest times to the present day.

W. & R. CHAMBERS, Ltd., London and Edinburgh.

Horace Marshall & Son's
NEW LIST.

New Illustrated Catalogue sent post free.

FOUR NEW "TEMPLE READERS."

The Preparatory Temple Reader. Edited by C. L. THOMSON, Joint Editor of the *Junior Temple Reader*; Examiner in English Literature to the Central Welsh Board. With Two Pictures in Colours, and many other illustrations. Cloth. Specially designed cover. Price 1s. 6d.

The Temple Infant Readers. Three charming Booklets, bound in stout paper covers, and containing many illustrations in colour and in black and white. No. I., 4d.; No. II., 4d.; No. III., 6d.

NEW AIDS TO THE TEACHING OF HISTORY

Illustrative History. I.—BRITISH AND OLD ENGLISH PERIOD. By E. J. BALLEY, B.A., of the Whitgift Grammar School, Croydon. Cloth. 2s. Fully illustrated. II.—TUDOR PERIOD. By N. L. FRAZER, B.A. Cloth. 2s. Fully illustrated.

This series is intended to be used in illustration of whatever History textbook may be in use. The many extracts given, from contemporary and other authors, supply fuller and more picturesque detail than is permitted by the limits of the ordinary text-book in English History.

Ancient History. By W. H. SALTER, B.A., LL.B., late Scholar of Trinity College, Cambridge. With many illustrations. Cloth. Price 2s. 6d.

THE CARMELITE CLASSICS.

Standard English Texts, low in price and attractive in appearance. Each part contains a short bibliography and a note on metre; also a series of questions on the text, which it is hoped may prove stimulating to the pupil and suggestive to the teacher. Bound in stout paper covers.

Chaucer.—THE PROLOGUE TO THE CANTERBURY TALES. Edited by C. T. ONIONS, M.A. 6d.

Milton.—COMUS. Edited by C. T. ONIONS, M.A. 6d.

Milton.—L'ALLEGRO AND IL PENSEROSO. Edited by C. L. THOMSON. 4d.

Goldsmith.—THE DESERTED VILLAGE. Edited by C. T. ONIONS, M.A. 4d.

DEUTSCHE SAGEN. A Reading Book in German. Edited by MARGUERITE NINET. Adapted for pupils in their third year. Containing five charming stories based on mediæval legends, and prettily illustrated. Price 1s. 6d.

DES VACANCES À PARIS. By VIOLET PARTINGTON, French Mistress at the Queen's College School. Illustrated. Cloth. 1s. 6d.

BOTANY RAMBLES: AUTUMN. A delightful little first book in Nature Study, the third part of the work. Limp cloth. Fully illustrated. 1s.

Complete NEW CATALOGUE, with Specimen Pages and all particulars of Messrs. Horace Marshall & Son's well-known "Temple Readers," "Romance Readers," "First History of England," etc., etc., sent free on receipt of Post Card.

N.B.—Specimen Copies of any of the above Books sent on approval for return, or at half-price for retention.

London: HORACE MARSHALL & SON,
Temple House, and 125 Fleet Street, E.C.

It is easily seen that these values are in the ratio of 33 : 11 : 24. Hence if the required proportions of the two given alloys are as $m : n$, we must have

$$33m + 11n = 24(m + n).$$

$$\text{Therefore } 33\frac{m}{n} + 11 = 24\frac{m}{n} + 24.$$

$$\therefore 9\frac{m}{n} = 13.$$

$$\therefore \frac{m}{n} = \frac{13}{9}.$$

Hence 13 parts by weight of the first alloy must be mixed with 9 parts by weight of the second in order to obtain an alloy worth £2, 10s. an ounce.

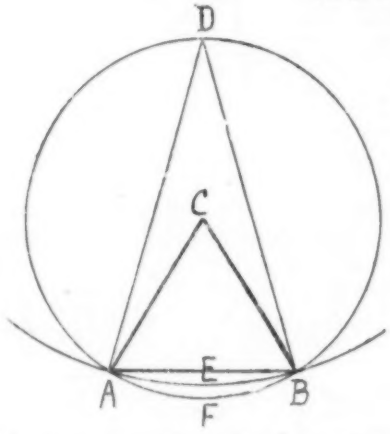
Chesterman.—Two circles are drawn through two points A and B, and their centres are on the same side of AB. The radius of the small circle equals AB, and the centre of the larger circle is on the circumference of the smaller circle. Show that the area common to the two circles is given by the formula

$$a^2\left(\pi - \frac{6 - \pi\sqrt{3}}{12}\right),$$

and that this is very nearly the same as $\pi a^2 \times \frac{11}{13}$, where a stands for AB.

[*N.B.*—$\sqrt{3} = 1{\cdot}732051$, and $\frac{1}{\pi} = 0{\cdot}318310$.]

(Stage 3, 1904.)



Let C be the centre of the smaller circle AFB, and D the centre of the larger circle AEB. Join DA, DB, CA, CB. Then by the question CAB is an equilateral triangle. Hence the angle ADB is 30°. Also the triangle DAB is isosceles, and each of the angles DAB, DBA is 75°.

The required area

= area circle DFB − area segment AFB + area segment AEB

$$= \pi a^2 - \left(\frac{\pi a^2}{6} - \tfrac{1}{2}a^2\frac{\sqrt{3}}{2}\right) + \left(\frac{\pi}{12}R^2 - \tfrac{1}{2}R^2 \sin 30°\right),$$

where $R = \frac{a}{2}\sec 75°$ is the radius of the larger circle.

$$\text{Therefore } R^2 = \frac{a^2}{4}\left(\frac{2\sqrt{2}}{\sqrt{3} - 1}\right)^2 = (2 + \sqrt{3})a^2.$$

Hence the required area

$$= \pi a^2 - \frac{\pi a^2}{6} + \frac{\sqrt{3}}{4}a^2 + \frac{2 + \sqrt{3}}{12}\pi a^2 - \tfrac{1}{4}(2 + \sqrt{3})a^2$$

$$= a^2\left(\pi - \tfrac{1}{2} + \frac{\sqrt{3}\pi}{12}\right)$$

$$= a^2\left(\pi - \frac{6 - \pi\sqrt{3}}{12}\right).$$

The last expression may be written in the form

$$a^2\left(1 + \frac{\sqrt{3}}{12} - \frac{1}{2\pi}\right)\pi$$

$$= a^2\frac{\left(12 + \sqrt{3} - \frac{6}{\pi}\right)}{12}\pi$$

$$= a^2\frac{(13{\cdot}732051 - 6 \times 0{\cdot}318310)}{12}\pi$$

$$= \frac{13{\cdot}732051 - 1{\cdot}909860}{12}\pi a^2$$

$$= 0{\cdot}9851826\pi a^2, \text{ nearly}$$

$$= \tfrac{1}{1}\tfrac{3}{3}\pi a^2 \text{ nearly,}$$

since $\frac{11}{13} = 0{\cdot}985185\ldots$

Alternative.—A district which is in shape a square of 10 miles side has been partly mapped to a scale of 6 inches to the mile, and partly to a scale of 4 inches to the mile. The area of the two maps together is 2,500 square inches. What area has been mapped to each scale?

Let x be the number of square miles mapped to the 6-inch scale, and y the number of square miles to the 4-inch scale.

Then by the question we have

$$(6)^2x + (4)^2y = 2500.$$

Also by the question we have

$$x + y = (10)^2.$$

Hence $36x + 16y = 2500$, and $16x + 16y = 1600$.

$\therefore 20x = 900$. Hence $x = 45$, and $y = 55$.

D. V. G.—Find for what value of a the fraction

$$\frac{2x^3 + (5 + a)x^2 - 7x + (4 - a)}{6x^3 - (1 - 3a)x^2 + 3x - (4 + 3a)}$$

can be reduced to a fraction of the form

$$\frac{mx + n}{px + q}.$$ (Cambridge Senior, 1903.)

Determining the G.C.M. of numerator and denominator in the usual way, we have first of all—

$$2x^3 + (5 + a)x^2 - 7x + (4 - a)$$

$$) 6x^3 - (1 - 3a)x^2 + 3x - (4 + 3a) (3$$

$$6x^3 + 3(5 + a)x^2 - 21x + 3(4 - a)$$

$$- 16x^2 + 24x - 16$$

Dividing the remainder by -8, the quotient of the result into the first divisor is found as follows—

$$2x^2 - 3x + 2$$

$$) 2x^3 + (5 + a)x^2 - 7x + 4 - a \left(x + \frac{8 + a}{2}\right.$$

$$2x^3 - 3x^2 + 2x$$

$$(8 + a)x^2 - 9x + 4 - a$$

$$(8 + a)x^2 - \frac{24 + 3a}{2}x + 8 + a$$

Hence it is seen that there is no remainder if $a = -2$.

The given fraction is then

$$\frac{2x^3 + 3x^2 - 7x + 6}{6x^3 - 7x^2 - 3x + 2}.$$

Dividing each term by the G.C.M. $2x^2 - 3x + 2$, the fraction reduces to $\frac{x + 3}{3x + 1}$, and this is of the required form.

H. H.—We are not quite clear whether you intend to read up for the B.Sc. Honours Examination in Chemistry without the aid of a professor and the run of a well-found laboratory. If you are reading with a professor, you had better follow his advice on the subject of text-books and course of reading. If not, you will find the books rather expensive, unless, of course, you can borrow them from a well-found public library.

1. *General Theoretical Chemistry.*—We presume that you have gone through the more elementary parts, but you will find a good summary of the matter in Professor Tilden's *Chemical Philosophy* (Longmans, 3s. 6d.). You will gain a great advantage by reading through Mendelejeff's work in the English translation, published by Longmans in two volumes. You will be delighted with this.

2. *Chemistry of the Carbon Compounds, commonly called "Organic Chemistry."*—It seems impossible to produce a better text-book for any student, especially the private student, than Professor Remsen's *Organic Chemistry* (Macmillan, 6s. 6d.). It sets one thinking, and leads one to reason the subject out for himself. Fownes's *Organic Chemistry* (Churchill, 10s.) is a book to be recommended as far as matter goes.

3. *Physical Chemistry.*—Procter's *Spectrum Analysis* (S.P.C.K.), Cooke's *Chemical Physics* (Macmillan, 21s.). I have heard of a book by Thorpe and Rücker, but do not know it personally. It ought to be a good one.

4. *History of Chemistry.*—You will get much information from the introductory sections in Roscoe and Schorlemmer, which is too large a work for general use. Van t Hoft's work translated into English is a standard work.

Valuable books dealing with practical methods are Emerson Reynolds's *Experimental Chemistry*, in four parts, from 1s. 6d. to 4s.; Cohen's *Practical Organic Chemistry* (Macmillan, 2s. 6d.).

Cambridge University Press.

SOLUTIONS OF THE EXERCISES IN GODFREY AND SIDDONS' ELEMENTARY GEOMETRY. By E. A. Price, B.A., Master at Winchester College. Crown 8vo, 5s. net.

ELEMENTARY GEOMETRY (PRACTICAL AND THEORETICAL). By C. Godfrey, M.A., Senior Mathematical Master at Winchester College, and A. W. Siddons, M.A., Fellow of Jesus College, Cambridge, Assistant Master at Harrow School. Large crown 8vo, pages xii–356.

(1) Complete in One Volume, price 3s. 6d.
(2) In Two Volumes. Vol. I, (Experimental Course, and Books I. and II.), 2s.; Vol. II. (Books III. and IV.), 2s.
(3) In Five Parts: Part I. (Experimental Geometry), 1s.; Part II. Theoretical Geometry, Book I., 1s.; Part II. Book II., 1s.; Part II. Book III., 1s.; Part II. Book IV., 1s.

Answers to the Examples, price 4d., post free.

This book has been written especially with a view to the New Syllabus of Geometry adopted by the University of Cambridge.

CAMBRIDGE LOCAL EXAMINATIONS, DECEMBER 1905
THE PITT PRESS SHAKESPEARE FOR SCHOOLS.

TWELFTH NIGHT. With Introduction, Notes, Glossary, and Index by A. W. Verity, M.A. Fifth Edition. 1s. 6d.

Journal of Education—"The best school edition of the play that has come under our notice."

MACBETH. By the same Editor. Second Edition. 1s. 6d.

THE STUDENT'S SHAKESPEARE.

DESIGNED FOR CANDIDATES FOR THE HIGHER CERTIFICATES.

THE TRAGEDY OF MACBETH. Edited by A. W. Verity, M.A. 2s. 6d.

Guardian—"An edition of rare merit, suited to the highest study of the poem."

School World—"A storehouse of learning, marvellously full and well arranged, and appears destined to provide quite a standard edition for the purposes of all higher examinations."

CAMBRIDGE LOCAL EXAMINATIONS, DECEMBER 1905
THE PITT PRESS SERIES AND CAMBRIDGE SERIES FOR SCHOOLS AND TRAINING COLLEGES.

Author.	Work.	Editor.	Price. s.	d.
Scott.....	The Lay of the Last Minstrel	J. H. Flather.....	2	0
	Guardian—"One of the very best edited school texts ever placed before the public."			
Milton.....	Samson Agonistes.....	A. W. Verity.....	2	6
Merimée....	Colomba	A. R. Ropes.....	2	0
Hauff.....	Das Wirthshaus im Spessart	A. Schlottman & J. W. Cartmell	3	0
Goethe.....	Iphigenie in Tauris.....	Karl Breul	3	6
Freytag.....	Die Journalisten	H. W. Eve.....	2	6
Caesar.....	De Bello Gallico. Book I.	A. G. Peskett.....	1	6
"	"	E. S. Shuckburgh.	1	6
	(With complete Vocabulary.)			
Cicero.....	Pro Murena.....	W. E. Heitland...	3	0
Horace.....	Odes. Book I.	J. Gow.....	2	0
Livy.....	Book V.	L. Whibley.....	2	6
Vergil.....	Aeneid. Book II.....	A. Sidgwick.....	1	6
Also an Edition with complete Vocabulary		"	1	6
Demosthenes	The Olynthiac Speeches....	T. R. Glover.....	2	6
Euripides..	Medea.....	C. E. S. Headlam.	2	6
Homer.....	Iliad. Book XXIV.....	G. M. Edwards ...	2	0
Plato.....	Apologia Socratis.....	J. Adam.....	3	6
Xenophon..	Anabasis. Book IV	A. Pretor.....	2	0
"	" "	G. M. Edwards...	1	6
	(With complete Vocabulary.)			

London: C. J. CLAY & SONS, Cambridge University Press Warehouse, Ave Maria Lane.

TEXT-BOOKS FOR HIGHER SCHOOLS.

Edited by Rev. C. S. DAWE, late of St. Mark's College, Chelsea.

CONCISE. SIMPLE. COMPLETE.

These books are specially prepared for the Oxford and Cambridge Preliminary and Junior **Local Examinations** and Candidates for **Minor Scholarships.** The Series consists of the following books:—

ARITHMETIC.

Small amount of **Theory,** large amount of **Practice.** Worked-out **Examples** for each step. Prominence given to the **Metric System. Laboratory Exercises** in a Special Section.

GEOGRAPHY.

In use at Wellington College.

Physical facts made the basis of **Political. Commercial** aspects kept constantly in view. British Empire fully treated.

Many Coloured Maps and Diagrams.

ENGLISH GRAMMAR.

Examples made the basis of instruction. **Analysis** introduced **early.** Aids to **correct speaking** a prominent feature. Plenty of scope given for **"practice."**

ENGLISH HISTORY.

Contains landmarks of our national history. More than usual attention given to last three centuries. **The Growth and Greatness of the Empire specially considered.**

Published at One Shilling each.

The Schoolmaster says:—"We can speak well of all. Each book will be found just the kind to place in the hands of pupils beginning a systematic course of study in these subjects."

Specimens and Particulars gratis on application.

GOOD MAPS AT LOW PRICES.

THE VIADUCT SERIES
OF
SCHOOL WALL MAPS
ARE

BROUGHT UP TO DATE,
PRINTED IN PERMANENT COLOURS,
CLEARLY AND BOLDLY MARKED,
STRONGLY MOUNTED,

with the result that they have been adopted by all those Principals in need of a

RELIABLE MAP AT A LOW PRICE.

The Series consists of

THE WORLD IN HEMISPHERES:

Europe.	**N. America.**	**England.**
Asia.	**S. America.**	**Scotland.**
Africa.	**United States.**	**Ireland.**

Size 46 in. by 39 in., mounted on Linen, Roller, and Varnished.

Published Price, 7s. 6d. each.

A Specimen portion of a Map will be sent gratis on application.

The Educational Supply Association, Ltd.,

42 HOLBORN VIADUCT, LONDON, E.C.

THE EDITOR'S TABLE

ALLMAN AND SON.

Style in Composition. By W. J. Addis, M.A., London University teacher in English.

Mr. Addis has undertaken here a very difficult task, and many a student will be grateful to him for the result of his labours.

To teachers of composition there comes at last a stage where further advance is very difficult. Punctuation is mastered, subject-matter is true and full enough, vocabulary is correctly used, and yet the composition is commonplace, uninteresting. What is wanting? Style. How shall it be got? And our guides with one accord bid us read good literature. Well, the advice is sound. One must read. But will that alone produce originality or brilliance?

This book deals with the many qualities and characteristics of style, their use and abuse; it points out what one has to look for in stylic analysis of literature.

Advanced students — would-be graduates, for instance — are often troubled in the preparation of specified authors in English. With Chaucer, Shakespeare, Spenser one knows what is expected; but if Addison, Johnson, or Burke is set, what do the examiners ask? Mr. Addis has pointed out some very useful ways of estimating the literary quality of their work, and that is what is wanted.

AMERICAN BOOK CO.

A Greek Primer. By Clarence W. Gleason, A.M. (Harvard). Our cousins across the ocean, as becomes a democratic community, are breaking away from traditional usage in the study of the classics much more rapidly than we are. This Greek primer has many new features, notably the introduction of the verb at the very first. The early appearance of what a schoolboy would call "real Greek" is a welcome feature. A useful appendix on derivation of words might well be studied almost *pari passu* with the earlier pages, so helpful is it in giving a clear idea of the exact meaning of a word. The book is an undoubted addition to our classical aids.

Latin Prose Composition. By Henry Carr Pearson, A.B. (Harvard). A manual of Latin composition on a somewhat unusual plan. In the first part the ordinary rules of Latin syntax are treated of, with suitable exercises. In Part II. Cæsar's *De Bello Gallico*, I.-IV., is taken as the base, and sentences practically taken bodily therefrom are given in English, to be restored to Latin. The third part contains sentences not so easily traceable, from various sources which are named. The whole book gives a good grounding in composition, and any one who has worked through it should have gained a fair standard of proficiency in writing Latin.

D. APPLETON AND CO.

The Evolution of the Elementary Schools of Great Britain. By James C. Greenough, A.M., LL.D., formerly Principal of Rhode Island Normal School, Providence, R.I., etc. (International Education Series.) If we might borrow a phrase from the place of origin of this book, we should describe it as a "back number," despite an evident endeavour to bring it up to date. Throughout the long discussion of our elementary schools, the writer speaks of school boards as still existing, and it is only by way of addendum that the text of the last Education Act for England and Wales is given, readers being left to find out from the Act how the situation has been changed thereby. Again, while the writer has realised that school inspectors are now "His Majesty's Inspectors," he still speaks of "Queen's Scholars." The book has either been written too soon or published too late to be of any service to English readers; but as it is presumably intended chiefly for American readers, it will be found as well up to date as most of the information regarding England which is supplied to them by their native press.

The preface contributed by Dr. W. T. Harris, the general editor of the series, is a curiosity in its way, and the American who accepts its statements and theories regarding English social and political affairs will probably increase his patriotism rather than his knowledge. It is interesting as showing, even in a cultured and scholarly mind, the provincialism—we cannot find a word which will better express the idea—which afflicts so many of our cousins, and is as fatal as our own insularity of mind to the power of appreciating social phenomena of a type foreign to the nationality of the individual.

E. J. ARNOLD AND SON.

Complete Clay Modelling. By William Reid. The editor of Messrs. Arnold and Son prints a note at the commencement of this book conveying the news of the author's death while the work was in progress. Mr. Reid therefore never saw his completed work. There are a very great number of exercises in the book which are in themselves very suggestive and useful, and though we differ from the author in the method of working, we must under the circumstances refrain from detailed criticism.

Stories from the Life of King Alfred. By Charles A. Milford. This is one of a series of most interesting supplementary reading books, and belongs to Grade IV., which is the set suitable for children in Standard IV. The editor has taken care to supplement the stories by adding notes and meanings. These are most useful, and are thoroughly reliable as regards their accuracy both from a literary and a historical point of view. The stories themselves are well adapted to the capabilities of the children for whom they are written, and they are taken from reliable sources. Suitable poetic pieces from standard authors are printed between some of the chapters of the book. These add considerable interest to the publication.

G. BELL AND SONS.

Bell's Miniature Series of Musicians. Two more volumes have been added to this interesting series—*Mendelssohn*, by Vernon Blackburn; and *Handel*, by Dr. Cummings. The former sets out the details of the biography of Mendelssohn and the chief points in his work with great clearness, but leaves the impression that the writer would have liked to bestow higher praise, but does not feel justified in doing it. The sketch of Handel's life and work is one of the most interesting books of the kind we have read. It has evidently been a congenial task for Dr. Cummings to set down the results of his deep studies for the benefit of the reading public.

The Fitzroy Pictures of the Months. The new Fitzroy Pictures of the Months, just published by Messrs. George Bell and Sons, London, have a delightful freshness and originality about them which will ensure them an early place among the series of well-known pictures for kindergartens and schools.

The drawing is exceedingly good, and the colouring pleasing and harmonious. The scenes depicted are correct, and such as might come within the experience of children living in or near the country; and the artist, whilst seeking to be true to nature, has not forgotten the ideal side and the human interests. The May and August scenes are specially charming.

Whilst the pictures are suitable in themselves for children of kindergarten or infant school age, the old sayings round them will appeal more readily to older children. Teachers may also find such old rural proverbs useful, as there is generally some important fact underlying them. When we say, for instance, that "a peck of March dust is worth a king's ransom," we mean that whilst raising much dust the dry winds of March sweeten the soil and make it friendly or in good condition for the seed, and that sowings made then yield such an abundant harvest that sufficient money could easily be realised therefrom to procure even the ransom of a king.

The pictures would prove very useful with groups of children and *small* classes. The pictures are extremely good.

ADAM AND CHARLES BLACK.

Normandy and Picardy: their Relics, Castles, Churches, and Footprints of William the Conqueror. By C. B. Black. With four maps and fourteen plans. Readers of this journal will be interested to learn that this edition, the sixth, of Black's well-known guide to Normandy, has been revised and brought up to date by Mr. T. B. Ellery, F.E.I.S., F.R.G.S. With the guarantee of his careful revision added to the former completeness of the book, it can be confidently recommended. While the typography has suffered somewhat as to want of uniformity in its "leading," through the alterations on the former editions,

THE

EDUCATIONAL MUSICAL INSTRUMENT CO.

(ESTABLISHED 1881)

Is now supplying a
Second Generation
WITH
PIANOS, AMERICAN ORGANS, HARMONIUMS, ETC.

For LISTS AND DESIGNS apply to the
MANAGER,
43 Estate Buildings,
Huddersfield;
or, 19 Highbury Place, London, N.
(ALSO AT EDINBURGH.)

MANY THOUSANDS of Teachers, School Managers, etc., including **Twenty-five of H.M. Inspectors of Schools**, are using and recommending our Instruments, of which we have specimens **in every County of the British Isles.**

SCHOOL PIANOS, Etc., A SPECIALITY.

We have over 1,800 in use, our large trade enabling us to offer unapproached bargains. You would also find our Violin Outfits for Orchestral Classes unequalled in quality and price.

See our 45 Guinea Prize Medal Upright Iron Grand Piano for £21 cash, or 36 payments of 14s. 2d. per month. Quite new, rich full tone, and thoroughly durable.

We pay carriage, give a month's free trial, a ten years' warranty, and exchange free of cost if the instrument sent is not all that is desired.

Mr. J. H. YOXALL, M.A., M.P., Gen. Sec. N.U.T., writes:—"For the fourth time I have experienced, for myself or for relatives, the special value, wide selection, and expert advice which your clients gain. Each of the four Pianos has given perfect satisfaction."

Show-rooms open Daily. Call and see our Stock, or write for our List of Instruments for Home or School Use, specifying the class preferred, and you will find

WE CAN SAVE YOU MANY POUNDS.
(*Please mention this Paper.*)

MANCHESTER
Correspondence College.

PHYSIOGRAPHY.
MATHEMATICS.
CHEMISTRY.
SOUND, LIGHT, AND HEAT.
MAGNETISM AND ELECTRICITY.
MECHANICS.
PHYSIOLOGY.
HYGIENE.
NATURE STUDY.
BOTANY.
ZOOLOGY.
BIOLOGY.

Correspondence tuition is given in the subjects enumerated for the **BOARD OF EDUCATION (S.K.), MATRICULATION, INTERMEDIATE SCIENCE, SCHOLARSHIP, CERTIFICATE, A.C.P., L.L.A.,** and other examinations. Prospectus, with full particulars of Prizes ranging in value from 5s. to £5, will be sent on application. Intending students should join at once.

TERMS—S.K. (20 lessons) Elementary, 10s.; Advanced, 15s.

Address—Secretary, Manchester Corr. College, 58 Grosvenor Street, Manchester.

BATTERSEA POLYTECHNIC, S.W.

Principal—
SIDNEY H. WELLS, Wh.Sc., A.M.Inst.C.E., A.M.Inst.M.E.

Session 1904-5, commencing Sept. 26th, 1904.

SPECIAL CLASSES FOR TEACHERS.

MANUAL TRAINING.—Woodwork and Metalwork.
ART CLASS TEACHERS' CERTIFICATE CLASS and
SPECIAL CLASSES FOR ELEMENTARY DRAWING CERTIFICATE.

Classes in preparation for EVENING SCHOOL TEACHERS' CERTIFICATE IN DOMESTIC ECONOMY, and for SCHOOL TEACHERS' CERTIFICATE IN DRILL OR GYMNASTICS.

Classes in CHEMISTRY, PHYSICS, BOTANY, PHYSIOGRAPHY, PHYSIOLOGY, HYGIENE, and other Science Subjects—Lectures and Practical Work.

Preparation for the Society of Arts and other Examinations.
LONDON UNIVERSITY EXAMINATIONS.

Day and Evening Courses for **MATRICULATION, INTER. B.Sc., and B.Sc. under recognised Teachers of the University.**

Abridged Prospectus free. Detailed Prospectus, 1d.; post free, 3d.

JOSEPH HARWOOD, *Secretary.*

Keith Prowse & Co

ESTABLISHED 100 YEARS.

NEW CENTURY
NEW MODEL

CASH £26 FREE DELIVERY

OR 30 MONTHLY INSTALMENTS OF 21/-

Come & See It
OR
WRITE FOR CATALOGUE
MENTIONING THIS PAPER
48 CHEAPSIDE LONDON E.C.

NOW READY.

JAPANESE GRAMMAR SELF-TAUGHT.

By H. J. WEINTZ.

In Roman Character, with Phrases and Idioms.

CONTENTS.

Grammar and Syntax, with Pronunciation.—Native Japanese Characters, etc.—Conversational Phrases and Sentences: Idiomatic Expressions, Travel Talk, Commercial Phrases, Shopping, Correspondence, etc., etc.—Vocabularies: Japanese-English, English-Japanese.—Money, Weights, and Measures.

Crown 8vo, 184 pages. Cloth, 5s. Wrapper, 4s.

E. MARLBOROUGH & CO., 51 Old Bailey, London, E.C.

GEOLOGY, PHYSICAL GEOGRAPHY, NATURAL SCIENCE.

A grand show of Typical Specimens for Teaching and Demonstrating Geology, etc., characteristic Fossils and Rocks, all the Rock-forming Minerals, all kinds of Mineral Ores, including cheap specimens of Silver and Gold. Thousands of specimens from 3d. each. Lists free. Special display for Teachers and Students on Saturdays, open till 7 p.m.

RICHARDS' SHOW ROOMS, 3 Beauchamp Place, Brompton Road, South Kensington.

Now Ready, Second Edition, 1s. net; by post, 1s. 1½d.

WILD OATS: A Sermon in Rhyme.

By MAURICE C. HIME, M.A., LL.D., sometime Headmaster of Foyle College, Derry.

"Smooth versification and sound sense."—*Guardian.*
"A wholly praiseworthy desire to keep boys from going to the bad."—*Morning Post.*
"A sound and forcible argument against the common wild-oats theory."—*The Literary World.*
"A modest volume of moral argument in sturdy heroic couplets, handled with distinct facility and vigour."—*St. James's Gazette.*
Favourably noticed also by the *Scotsman, Lancet, Educational Times, Rock, Gentlewoman, To-day, Catholic Herald, Irish Times,* and many other papers.

London: J. & A. CHURCHILL, 7 Great Marlborough Street.

the gain in accuracy will more than make amends to the tourist, and the maps and plans are excellent.

BLACKIE AND SON.

Decimals and the Metric System. The teaching and exercises of this little manual are both excellent. Its thirty-two pages are splendidly arranged as regards the setting out of the work. No step seems to have been omitted, and each is in its proper place. It should be a valuable aid to children in Standards IV. and upwards.

The Science of Laundry Work. Rankin. Miss Rankin has conferred a very great benefit upon laundry teachers by the issue of this little book. The majority of these ladies have, until very recently, been trained on the rule-of-thumb principle, and have never had the opportunity of putting their art on a proper scientific basis. The laundry worker who assimilates this very readable book will bring to her task intelligence as well as skill, and be able to say why a thing is done, as well as how. Miss Rankin's method befits a practical teacher of such experience; she covers the whole field of laundry practice in a score of chapters, taking up the chemical basis of the subject under such heads as Soap, Starch, Laundry Blue, etc., and follows up each chemical lecture by an experimental model lesson with blackboard summary. Teachers of the domestic arts will welcome this publication, which has been long demanded.

First Steps in German. By W. Scholle, Ph.D., and G. Smith, M.A. This work forms one of a series intended to teach German by the newer methods. It consists of fifty-four lessons graduated in difficulty, and of ten German folk-songs with musical notation. Each of the lessons is followed by a questionary and grammatical exercises arising out of the lesson. The formal grammar is contained in *A First German Grammar*, by the same authors, which is intended to be used concurrently with this book. The exercises are well graduated, and the book contains many useful and practical suggestions for the teaching of German. A careful and methodical study of this book should do much to remove the difficulties which lie in the path of the young student of German.

A Practical German Composition. By Alfred Oswald, Lecturer in German at the Church of Scotland Training College, Glasgow. We have always entertained very considerable doubt as to the utility of placing a book like this in the hands of a student whose reading in German has not already been fairly extensive; and Mr. Oswald himself admits in his preface that "students who have only mastered a comparatively small part of the German grammar generally fail in the attempt to render a connected extract into German." The danger of books of this sort is that they more or less lead the pupil away from the course he should pursue, if he wishes to crown his studies by acquiring the ability to write correct and idiomatic German. No one can hope to reach this goal who has not read much and carefully. It is to us somewhat of a matter of surprise that Mr. Oswald has not insisted on this point. *Lesen, viel lesen, sehr viel lesen* must be the motto of the student. For the student who is continuing his reading there is much in Mr. Oswald's book which will be useful to him in acquiring the ability to write German.

CAMBRIDGE UNIVERSITY PRESS.

Erasmus concerning Education. By W. H. Woodward, M.A. It is a pleasure to turn to a book written by a man who evidently has such a love for his subject. It will be read with pleasure and profit by all who take it in hand; the parts showing *how* Erasmus proposed to base a liberal education upon ancient literature, and *why* he did not use the subjects available in modern times, will afford much food for thought to those engaged in drawing up curricula for secondary schools. Part II. contains a careful translation of some of the educational writings of Erasmus.

W. AND R. CHAMBERS, LIMITED.

Twentieth Century Geography Manuals. No. VIa.—The World outside Europe. Used in connection with the reader we reviewed in a recent issue this manual is invaluable. As an epitome, too, for revision before examination it is excellent; in fact, in all ways it will be found to be of great value for class work and to students generally.

Chambers's Cyclopædia of English Literature. The third volume of this valuable work has just appeared, and completes the reissue in the new form. The first volume carried the history towards the completion of the seventeenth century, the second dealt with the writers of the eighteenth century, and the one before us brings the work practically to the present day. Upwards of six hundred writers are specially dealt with in this volume. Each has a biographical and bibliographical summary, followed by interesting and beautiful extracts in prose and poetry. When we say that the volume consists of nearly a thousand pages, our readers may have some idea of the wealth of material available for study and reference. The work is beautifully printed, and richly illustrated by many portrait illustrations charmingly reproduced. In addition to complementary lists of recent and contemporary British and American authors in various departments of literature, Dr. Patrick has provided the reader with a full and complete index. Each volume is published at 10s. 6d. net, so that for a guinea and a half it is possible to possess a cyclopædia of English literature of untold value. Every teacher's library in the country should contain a set of these volumes. Our colonial readers should also see that a set is near at hand.

CHARLES AND DIBLE.

The New Movement in Education. By Thiselton Mark, B.A., B.Sc. The author of this book has crowded into a hundred pages enough ideas to last the thoughtful teacher many years. The idea is, we hope, fast gaining ground that the teacher should know something about his profession. It is well-nigh incredible that the knowledge which underlies all successful training should have been relegated to the dusty corners of the study, and regarded as the useless vapouring of wild enthusiasts. But such has been the case, with the result that in place of education we have had cram; in place of the lofty ideal of turning out a child with its mental, moral, and physical faculties on the highroad to perfect development, there has been set up the fetish of standard passing and grant earning. With improved training of teachers this will disappear, and we trust Mr. Mark's excellent book will hasten the change which he so ably advocates.

J. AND A. CHURCHILL.

A Manual of Botany. Vol I.: Morphology and Anatomy. By J. Reynolds Green. This third edition of Professor Green's manual is practically a reprint of the earlier one. It is somewhat unfortunate that vegetable physiology has been relegated, along with the subject of classification, to Volume II., as it is undesirable to separate structure and function any more than is absolutely necessary. The combination suggested would lend itself admirably to what are, after all, the two great lines of approaching the subject—class work and field work. The study of morphology, anatomy, and physiology belongs to the class-room and laboratory, or at farthest the garden; while a volume on classification as naturally runs into field work, and would form the foundation of a distinct flora.

The present edition maintains the high place of Professor Green's manual as a text-book for university and similar examinations. It is a regrettable fact that examination botany has become to a very large degree one of the Greek dialects, and a great deal of labour has to be expended upon what is at best an expanded glossary. Copious illustrations of the best quality are freely used throughout the book to mitigate this evil, and the sections on tissue systems and stem structure, two branches of the subject which are apt to bewilder a superficial reader, are furnished with a wealth of illustration almost unique in English text-books.

JOSEPH FLOUDMONT-CARBONEZ. BRUGES.

A Practical School Grammar of the English Tongue. By M. Vanderstichele, Professor at the Episcopal College, Poperinge. This excellent little work is intended to teach the rules of spoken English to students who speak the native language of the Netherlands, variously known amongst us as Dutch or Flemish. The author has brought into a compact, well-arranged whole the fruits of his experience in teaching our language to his countrymen. Particularly intended for students in the humanities, its arrangement permits it to be used with profit by students of less exalted aims and even by beginners. The rules most necessary for the beginner, and the points of strongest contrast between Dutch and English, are printed in the largest type. The rules which are absolutely necessary for advanced students in the humanities are printed in type of intermediate size, whilst exceptions and remarks of less importance are printed in small type. The book is written in English, and the rules given are abundantly illustrated by quotations, mainly taken from present-day authors. We heartily recommend the book to the notice of those for whom it is intended.

GINN AND CO.

Die Drei Freier. By Levin Schucking. This story consists of a highly imaginative combination of Wandering Jew, Wild Huntsman, and Flying Dutchman. It will sustain the interest of the pupils, and give them good practice. There are good notes, but no vocabulary.

DENT'S

NEW LIST OF SCHOOL BOOKS.

NOTE.—Please write for New Educational Catalogue and Lists.

OXFORD LOCALS, 1905.

CÆSAR'S GALLIC WAR. Books II. and III. in one vol. Edited by A. Cowan Paterson, M.A. (Edin. and Oxon.). 1s. 6d.

CÆSAR'S GALLIC WAR. Books IV. and V. in one vol. Edited by Dr. John Marshall. 1s. 6d.

SCOTT'S "IVANHOE." Edited with Notes, etc., by G. L. Turnbull.

JULIUS CÆSAR. Edited by F. Armitage Morley, M.A. 1s. 6d.

THE MERCHANT OF VENICE. Edited by R. M'William, M.A. 1s. 6d.

DENT'S MODERN LANGUAGE SERIES.

DENT'S FIRST FRENCH BOOK. By S. Alge and Walter Rippmann. Extra fcap. 8vo. 1s. 6d. net.

. Since the publication, in November 1898, of **Dent's First French Book**, ten editions (completing 47,100 copies) have been called for. The further experience gained during the last five years has made it advisable to rewrite the book, and it is believed that the new version—**Dent's NEW First French Book**—represents a distinct step forward in the teaching of modern languages. The earlier version of **Dent's First French Book** is still on sale, and should be ordered as **Dent's OLD First French Book** to avoid confusion.

DENT'S SECOND FRENCH BOOK. By S. Alge and W. Rippmann. Extra fcap. 8vo. 1s. 6d. net. [*Fourth Edition.*

Note.—The above is undergoing revision, similar to that given to **Dent's First French Book.** [*Almost ready.*

Phonetic Part of New *First* French Book, 6d. net.

DENT'S WALL PICTURES OF THE FOUR SEASONS. (For Teaching French.) From Drawings specially prepared by J. A. Symington. Printed in Colours. Size, 35 by 35 ins. Unmounted, 2s. 6d. net; mounted on linen and eyeletted, 3s. 6d. net; mounted on linen and bound at edge, with rollers, 6s. net.

FEATURES OF FRENCH LIFE. By F. R. Robert. Illustrated by J. A. Symington. 2 vols., 10d. net per vol.

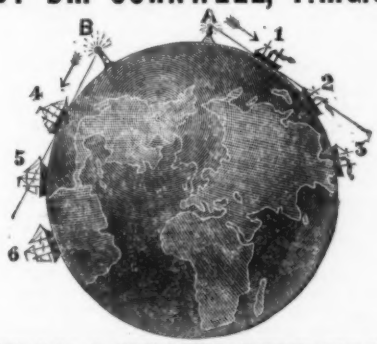
ELEMENTS OF FRENCH PRONUNCIATION AND DICTION. By B. Dumville, B.A. Extra fcap. 8vo. 2s. 6d. net.

DENT'S FIRST LATIN BOOK. By Harold W. Atkinson, of Rossall School, and J. W. E. Pearce, Headmaster, Merton College, Sidcup. With 12 Coloured Illustrations by M. E. Durham. Small crown 8vo., cloth. 2s. 6d. net.

DENT'S WALL PICTURES for Teaching Latin. Four Coloured Pictures enlarged from the First Latin Book. Size, 30 by 22 ins. Unmounted, 2s. net each. Roma, Sexti Domus. Roma, Triumphus. Pompeiis, Ostium, Tabernæ et Via Strata. In Gallia, Proceum Equestre et Pedestre.

J. M. DENT & CO.,
29 and 30 Bedford Street, LONDON, W.C.

APPROVED SCHOOL BOOKS
BY DR. CORNWELL, F.R.C.S.



Edited by J. CORNWELL ROUND, M.R.C.S.
With numerous Revisions and Additions by BEN JONSON.

A SCHOOL GEOGRAPHY. Ninetieth (Memorial) Edition. With Coloured, Black-and-white, and Star Maps; also numerous Diagrams. The Reviser has brought this book thoroughly up to date, and it now contains 384 pages, exclusive of 64 pages of Maps. 3s. 6d.

"The book is an immense storehouse of accurate geographical information, and a very suggestive book to the teacher."—*Educational Record*, June 1904.

"Seeing that it has thirty-six coloured Maps, and nearly twice as many uncoloured, the price is wonderfully low."—*The Journal of Education*, July 1904.

GEOGRAPHY FOR BEGINNERS. Seventieth Edition. Has been Enlarged and Revised, Maps and Diagrams having been also added. It now contains 160 pages of interesting matter. 1s.

"We have tested both these books on many points, and in every case with the most satisfactory results."—*School Guardian*, May 1904.

GRAMMAR FOR BEGINNERS. Ninetieth Edition. 1s. Revised, and with additional Section on Analysis of Sentences.

ALLEN AND CORNWELL'S SCHOOL GRAMMAR. 1s. 9d.

THE YOUNG COMPOSER. Forty-ninth Revised Enlarged Edition in the press. 1s. 6d.

London: **SIMPKIN, MARSHALL, HAMILTON, KENT, & CO.**

Mr. H. J.

SMITH'S CLASSES

SCHOLARSHIP, 1905.
CERTIFICATE, 1905 and 1906.
MATRICULATION, 1905.
A.C.P., 1904 and 1905. INTER. B.A., 1905 and 1906.

New Classes now beginning.

Write at once for new prospectus to

Mr. H. J. SMITH, B.Sc. (Lond.),
Rosebery House, Bream's Buildings, Chancery Lane, E.C.

EXAM. BOOK-KEEPING, Etc.

Sarll's Text-Book Sales over 200,000 Copies.

SARLL'S BOOK-KEEPING FOR NEW CODE. Stage I. Introductory; II. Practical; III. Theory or Journalizing. Each 48 pp. Price 4d. Outline Keys. *Schoolmaster* says:—"They are the *best* and *cheapest* manuals of the kind in the market." MS. Books, 2d. each.

SARLL'S PRACTICAL BOOK-KEEPING. Fourteenth and *greatly* improved Edition. *Teachers' Aid* says:—"There is no *cheaper* and *safer* guide." Consists of Grad. Exercises and Exam. Papers, with *full* or *outline* Keys. 128 pp. 1s. MS. Books, superior, 1s. Cheap, 4d.

SARLL'S DOUBLE-ENTRY BOOK-KEEPING. Fifteenth Edition. 2s. Complete with *full* or *outline* Keys. *Practical Teacher* says:—"We *heartily* recommend it as the *best* and *cheapest* manual we have seen." For Soc. of Arts Exams., Civil Service, &c. 256 pp. MS. Books, 1s. Cheap, 4d.

SARLL'S TWENTIETH CENTURY EXAM. PAPERS IN BOOK-KEEPING. Containing the *latest* papers by the *leading* Examining Boards, with notes and brief answers, in two parts, Sixpence each. Part I. Junior Papers, College of Preceptors, University Local, &c. Part II. Senior Papers, Society of Arts, London Chamber of Commerce, &c.

SARLL'S STUDENTS' BOOK-KEEPING. Chapters—Introductory, Theory, Practice, Exam. Papers, Trial Balances, Company Book-keeping, Mis. Difficulties, Sup. Papers, etc., etc. All Exercises with *full* or *outline* Keys. 250 pp. 2s. 6d. *In the Press.*

SUPPLEMENTARY KEYS.

I. TO SARLL'S PRACTICAL. Exercises Fully Worked. 2s.

II. TO SARLL'S DOUBLE-ENTRY. Exercises Fully Worked. 3s.

. Specimen Copies—except Keys—at one-third off, or Teachers can have Parcels for inspection, Post Free, from A. SARLL, A.K.C. (Lecturer, People's Palace, E., Polytechnic, W., Goldsmiths' Institute, S.E., &c.), 62 Oakley Road, London, N.

Lessons by Correspondence and Exams. conducted.

London: **GEORGE GILL & SONS, 13 Warwick Lane, E.C.**

The Best, Most Useful, and Cheapest Dictionary Extant.

NELSON'S

Royal English Dictionary.

714 Pages. Price 1s. net.

Prepared Expressly for School Use.

T. NELSON & SONS, 35 and 36 Paternoster Row, LONDON, E.C.;
Parkside, Edinburgh; and New York.

Germelshausen. By Friedrich Gerstäcker. A tale full of interest from its warm local colour and freshness. There are a vocabulary, full notes, and a set of useful imitative exercises.

Elementary German for Sight Translation. By R. C. Ford. A very useful collection of extracts. The equivalents of a few words are given in footnotes; but in order to serve the purpose for which the book is intended, there is no vocabulary or other assistance supplied.

Bacteria, Yeasts, and Molds in the Home. By Professor Conn. As its name implies, this is a book dealing with the domestic applications of the fungi, those poor relations of the current botanical text-books. Ordinary elementary books on botany deal almost exclusively with flowering plants—a few of a popular nature take up the ferns and their allies; but there is no similar attempt to deal with fungi, and more especially with those lower fungi which now play so important a part in our economy. There are plenty of large text-books on the subject, from Lafar's *Technical Mycology* on the one hand, to systematic works on bacteriology on the other; but these are written by specialists, and appeal to technical and professional students. Professor Conn's book, on the contrary, is not only readable by "such as are of weaker capacity," but very interesting, and his practical applications will commend themselves to any sensible housekeeper as another illustration of the maxim that science is only organised common-sense. As might be expected from the growing interest in the subject, fully one-half of the book is devoted to bacteria and their products, and the man in the street will find here all he wants to know about toxins and ptomaine poisoning. A useful appendix of practical work should prove very welcome to teachers of domestic science.

CHARLES GRIFFIN AND CO.

Elementary Manual on Steam and the Steam Engine. By Andrew Jamieson, M.I.C.E. It is unnecessary to enter into detailed criticism of a book which has reached its tenth edition; but for the information of those unacquainted with its contents, it may be desirable to point out that it is arranged to meet the requirements of the Board of Education and other examinations of a like character, including in its 330 pages simple and useful problems on mensuration, and chapters on heat, work, the slide valve, and boilers. In addition, engines of various kinds are well described.

The opportunities afforded by the various editions have been utilised to bring up to date the subject-matter, which is arranged in the form of lectures; and these contain not only numerous worked-out examples, but also a good selection of exercises, chiefly selected from the Board of Education papers and similar sources. The latter will be useful to students, especially as the answers are given.

A coloured folding plate shows clearly the details of construction of a Lancashire boiler.

HACHETTE AND CO.

The Metric System. By Georges Rousselle. Translated by R. Smith, of the Paris British Schools. Published under the patronage of the British Chamber of Commerce at Paris.

The name of the book explains its scope. The whole matter is very lucidly and systematically arranged, the logical nature of the system, of course, making this no very difficult task. The illustrations are very numerous and helpful, but we think that more of them might have been to full scale. They represent generally the actual forms of the various weights and measures in everyday use in Paris.

Every teacher would find this book useful to himself; but it especially commends itself as a class-book for use in higher-grade and secondary schools, where practical science is taught.

The full set of weights and measures, procurable from the same firm, would be an extremely useful adjunct, and the whole cost is quite moderate.

Half-hours with Modern French Authors (Prose and Verse). Second part. Edited, with a French-English vocabulary, by Jules Lazare, Bachelier-ès-lettres. This book contains nearly two hundred pages of well-chosen extracts. The pieces have the merit of being self-contained, interesting, and of a high literary standard. They should serve not only to increase the pupil's vocabulary and his power of reading French with ease, but also to inspire him with a desire to read more of the authors whose works are laid under contribution.

HEATH AND CO.

La Mère de la Marquise. By Edmond About. This charming story has been carefully edited by Dr. Brush of Johns Hopkins University. The notes are good and the vocabulary complete. The tale is complete in itself, and of a convenient length—109 pp.—for school use.

An Introduction to Botany. By William C. Stevens. One of the gratifying features of the American invasion is the freshness not only of point of departure but of method of approach to subjects worn old and threatened with staleness. A science teacher in Britain finds it well-nigh impossible to clear himself of habits of thought induced by the traditional syllabus of South Kensington, and hence many excellent British text-books suffer from sameness, covering the same ground in almost the same order, and differing only in phraseology and treatment of details.

The present volume is an introduction to botany, but it will be found much more useful in teaching genuine botany—plant life—than many more systematic and pretentious text-books. To teachers above all, even in higher grade schools, where the shadows of examinations linger longest, this book will be of very great service, providing, as it does, a rich quarry of observational and experimental material from which to build a systematic course of nature study in plant life.

Professor Stevens has done good service in giving a fair place to those botanical outcasts the flowerless plants; and his choice is abundantly justified by the very intimate part which these lowly forms, moulds, yeasts, bacteria, play in our everyday life. Chapter x. is devoted to model studies of thirty-seven typical plants; and though some of the species are not familiar in this country, enough is given to furnish a very complete training in observational work, a department which receives elaborate treatment in Part II., devoted to herbarium and laboratory practice. An illustrated glossary and a very copious index suitably close this work, which in finish supports the best traditions of American printing and illustration.

MONSIEUR LOUIS LATOUR, EDINBURGH.

Latour's New Course of French, based on Gouin's Method made Etymological and Grammatical. First Part. Like most practical teachers, M. Latour finds that the adult learner, and indeed all learners who are not in their early childhood, require more in French than mere oral conversation, and we have here the first lesson in Gouin's method expanded with elaborate notes, dealing with pronunciation, grammar, etc. As this is only the first of one hundred and fifty proposed parts in the course, we cannot judge of the scheme as a whole, but the thoroughness and the practical helpfulness displayed in this part is beyond all praise.

LONGMANS, GREEN, AND CO.

The Story of Our Lord's Life. By Maud Montgomery. With eight coloured plates after Gaudenzio Ferrari. The preface of this little book makes one pause and think. It is one of a series designed to provide "a graduated course of theological study which will be intelligible and interesting to children and young people." The Bible is a book which can be made intensely interesting to children, but surely there must be some mistake when any one proposes to teach theology to a child. Of course, the mistake may only be in the meaning of a word, but this is the most common and most persistent of all mistakes. We are further told that the instruction given will be in harmony with the principles of the teaching of the English Church, and "not inconsistent with the assured results of the best biblical and historical criticism." One would have expected these two aims to have been stated in the reverse order, which is surely the order of importance. When we turn to the story itself, we find that the writer has had as much success as can be hoped for; there is only one Book where this story has been told in the best way, and all other books can but aim at being the second best. The writer seems frequently to fall between the two aims of actually telling the gospel story and of acting as a commentator for the benefit of those who already have some familiarity with it, and the result is a want of unity in the execution. The plates in colour are excellently reproduced, and are by far the best thing in the book.

The Teaching of Dutch in South Africa. A paper read at a conference of principals of Government schools in the Orange River Colony, by Dr. Brill, Rector of the Grey College, Bloemfontein, together with a letter addressed to the rector by Mr. E. B. Sargant, Educational Adviser to Lord Milner. The bilingual problem exists in our new colonies in a very interesting and puzzling form, not unmixed with elements more political than educational. For a full discussion of the difficulty we recommend this pamphlet to all who are interested in the question or the colony.

M'DOUGALL AND CO.

Geographies of the Continents.—Europe. A clear and concise epitome, well filled with illustrations and maps—coloured, plain, and in relief.

AYRES' CLASSES.

CORRESPONDENCE CLASSES

FOR

PUPIL TEACHERS,

SCHOLARSHIP
1904 and 1905,

CERTIFICATE
1905 and 1906.

SYLLABUS, BOOK LIST, Etc., ON APPLICATION.

The above Classes have been officially chosen by the Education Committee of one of the largest counties for all their teachers to join.

BEST PREPARATION OBTAINABLE.

ORAL CLASSES

MEET AT

181 ALDERSGATE STREET, E.C.

Intending Students should join at once.

For Prospectus, Testimonials, etc., apply to

Mr. H. B. AYRES,

4 Arundel Square, BARNSBURY, LONDON, N.

NEW GEOMETRY.

The "SPENCER"

New Geometry Cards.

Being **Two Sets of Cards Illustrating the Geometry of Pattern Making.** Each Set contains **24 Plates.** The Problems are mainly of three kinds:—**1. Bands or Borders. 2. "All Over" Patterns. 3. Units Based on Definite Construction.** By H. W. DONALD, Designer of the "Alma" Floral Brush-Work Designs. Set **A**, Elementary, price, net, **1s. 6d.**; Set **B**, Advanced, price, net, **1s. 6d.**

BRUSH-WORK.

The "MODERN"

Pencil & Brush-Drawing Designs.

Being **Two Sets of Floral Designs.** Each set contains **24 Cards** printed in colours for **Freehand** and **Colouring**, separately or combined. The Cards provide excellent Material for teaching the **Elements of Design** and **Colour Harmony.** By H. W. DONALD, Designer of the "Alma" Floral Brush-Work Designs. Set **A**, Elementary, price, net, **2s.**; Set **B**, Advanced, price, net, **2s.**

A Catalogue of Special Works on Nature Study sent post free on application to

CHARLES & DIBLE,
LONDON: 10 Paternoster Square, E.C.
GLASGOW: 68 Gordon Street.
DUBLIN: 71 Middle Abbey Street.

TYPEWRITERS for SCHOOLS.

On the 30th June 1904, the Yōst Typewriter Co., Ltd., completed the largest and most successful year's business they have ever had; and, in connection with this, beg to point out to those who will require Typewriters for Teaching Purposes this Autumn the desirability of applying early for Machines, as the number available for purchase or hire on

SPECIAL SCHOOL TERMS

is necessarily limited.

Each succeeding year Teachers are finding out that the Yōst gives better results than other machines. Scholars learn it more quickly; it does not easily get out of order; the upkeep is ridiculously small; the machine lasts an enormous time; and the actual typewriting it produces is of a far higher standard than that of any other make of machines.

NEW or SECOND-HAND MACHINES may be secured for forward delivery if applied for NOW.

THE YŌST TYPEWRITER CO., Ltd., 50 Holborn Viaduct, E.C.

Branches in all Large Towns.

Laws of Health. This little book of eighty pages is practically the outcome of Circular 374 of the Scotch Education Department, explaining Art. 21 B of the Code. Part of the training in the recently created supplementary courses deals with such a general knowledge of physiology and hygiene as may become immediately useful to the man in the street. This book will prove very useful in such a course, especially if used as the theoretical basis for practical ambulance or similar work.

MACMILLAN AND CO.

Tennyson: A Dream of Fair Women, etc. By F. J. Rowe, M.A., and W. T. Webb, M.A. A nice collection of some of the best of Tennyson's poems. Included are "The Revenge," "The Lotos Eaters," "Ulysses," the "Coming" and the "Passing" of Arthur. Each poem has a good introduction dealing with the story of the poem; the notes are what is wanted in treating modern literature.

The most important section of the editors' work is the general introduction, dealing at some length with the poet's mind and art, as shown by his writings, and here we have abundant justification for the inclusion of a study of Tennyson in a school curriculum. Excellent is the analysis of Tennyson's artistic qualities and the support of each statement by numerous well-chosen passages.

Very striking in Tennyson's work is the admixture of the oldest beauties of poetry with graces of our modern poets, which but a generation past were heresies. Exact knowledge and observation of detail once seemed rather to be impediments to the poet; science and poetry were sundered by an impassable abyss. Yet Tennyson can draw his lovely similes from Saturn's rings, from the deposit of lime in the human skeleton:—

> "Still, as while Saturn whirls, his steadfast shade
> Sleeps on his luminous ring."

His knowledge of our trees and flowers is as exact and loving as a botanist's; no fact is more evident, no knowledge more elegantly used. Yet, for all the beauty of Virgil's *Georgics*, one feels that the older poet scarcely knew a dozen names, and that what he calls "viola" may be almost any little blossom.

And all the beauties of rhythm, of assonance, and alliteration, belong as fully to Tennyson as to Pindar, Theocritus, Virgil, and all the "old masters" of poetry. Where does the beat, the sound, suit the sense better than in

> "The sound of many a heavily galloping hoof,"
>
> "The league-long roller thundering on the reef"?

What Tennyson wrote of Virgil's art is true also of his own, and that is,—

> "All the charm of all the muses
> Often flowering in a lonely word."

Teach Tennyson to your older classes, not as material for expounding difficulties of grammar and language, but, as we teach part-singing and hang good pictures in our classrooms, to give to future generations nobler pleasures and loftier thoughts.

HORACE MARSHALL AND SON.

Botany Rambles. II.: Summer. This deals with the chief botanical phenomena of summer. The pupil's attention is directed to the most important and essential points in an interesting way, and by the use of simple language.

Recitations et Poésies, with Phonetic Transcript. Edited by Violet Partington. Illustrated by A. M. Appleton. A collection of poetical pieces for recitation, commencing with well-known French nursery rhymes, and leading up to folk songs and fables in verse. The interest of the book for little ones is much enhanced by the quaint illustrations.

A First Book in English Literature. By C. L. Thomson, Examiner in English Literature to the Central Welsh Board. The book is intended by its author for school use, but we are quite sure that older students will find the book a very useful and a very interesting one. The language is simple enough for boys and girls; but nothing is lost by it, for the appreciation and the criticism are as true as in much more ambitious works.

Two small volumes carry us from the earliest times to the early sixteenth century. We do not know how much further the book goes, but if carried on to the nineteenth century, it would be a useful addition to the library of candidates for the university degree, and of all who appreciate our national literature.

The best feature of the work is the very large use made of extracts from the authors dealt with, modernised in the Old English authors, but verbatim in the Middle English period. Very interesting, too, are the numerous facsimiles of letterpress and of illuminated manuscripts; other illustrations are numerous and good.

Appended to each chapter is a list of books worth consulting for more detailed information—a very useful feature to those studying some period in detail.

METHUEN AND CO.

A Weaver of Webs. By John Oxenham. Teachers who are on the lookout for holiday reading could not do better than add this book to their list. It is a story of the adventures of a young English diplomat among the Balkans, where he has been dispatched to carry out some difficult negotiations with a "weaver of webs," who unites in his person, unknown even to his wife and his other friends, the characters of Turkish minister, speculative financier, and brigand. The story is well told from beginning to end. The characters are alive and worth study; the incidents vary from high life in Vienna, through hairbreadth escapes at Constantinople and elsewhere, to tragedy, mystery, and romance among the mountains of the "near East." A book to be recommended without qualification alike for matter and for style.

NORMAL TUTORIAL SERIES.

Much Ado About Nothing: A Complete Paraphrase. Much Ado About Nothing: Parsed and Analysed. These handbooks may possibly be welcomed by the lazy or quite isolated student, but they are entirely superfluous to one of any perseverance and thought. The habitual use of such cribs entirely kills the individual thought and mental discipline which a systematic study of any good literature entails.

There are many points in the "Parsing and Analysis" open to adverse criticism—for example, the plan of analysis is not at all suited for Scholarship students.

History of the English Language. By W. Jayne West, B.A. This is a decidedly useful book. The author has selected his facts and illustrations with judgment and care.

OLIVER AND BOYD.

The Excelsior History Readers. We have here a meritorious attempt to arrange a four years' course of reading on the concentric plan, the aim being to impart a clear knowledge of the main details of English history. Book I. (Junior) for Standard III. is not yet ready. The Intermediate, Senior, and Advanced Books, for Standards IV., V., and VI.–VII. respectively, are out of press, and each contains many signs of careful work. The text is graduated more judiciously than is sometimes the case with sets of historical readers. Book IV., which we venture to think is not penned by the same writer as the earlier numbers, is practically a text-book of English history. Each page is full of information, the facts being related in a simple but not unattractive manner. If the concentric system leads to the assimilation of so generous a store, it speaks much for its practical value. The illustrations are unpretentious, but for the most part are really useful. There are reproductions of well-known pictures, original drawings, and pictures from photographs of stone circles, Roman remains, etc.—the last-named forming a particularly good feature. The maps are extremely simple, in one or two cases the names being scarce to the point of meagreness. At the end of Books II. and III. there are capital selections of standard poetry. Book IV. would gain by the inclusion of a useful summary of the kind provided, with less reason, in the earlier volumes.

SIR ISAAC PITMAN AND SONS, LIMITED.

Lessons in English. Part I. Some good lessons in English may be taught from the pages of this little book, even though it be used under the direction of a young and inexperienced teacher. It is an attempt to correlate spelling, word-building, grammar, and composition, and there are many exercises of various kinds. From an educational point of view, however, we question the desirability of such an exercise, which comes on nearly every page of the book, as that which requires children to supply parts of words—for example, "Butchers sell ch—s in their —ops," "Children must have g—d f—d," and "F—k fell off the pl— into the river." The words appear at the top of the page, but a class set to guess what *may* be the correct word is a class working, we think, on bad lines.

RELFE BROTHERS.

The Local Examination Physiography. By W. J. Perry, M.A., LL.D. This book, issued without preface, is evidently intended to be sufficiently described by its title. The illustrations are by no means numerous—thirty-six in all—and no great care seems to have been taken with these. A number of the pictures

RYDE'S CORRESPONDENCE CLASSES.

NEW CLASSES commence on October 4th for

CERTIFICATE, 1906.

SCHOLARSHIP, 1905.

Names can also be received for the Classes for A.C.P. Christmas Examination 1904, and for the CERTIFICATE Examination 1905.

Please address all communications:

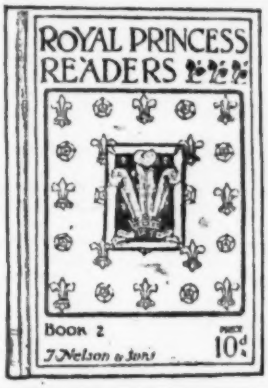
Mr. PERCY W. RYDE, 79 Gresham Street, London, E.C.

THOMAS NELSON & SONS'

ROYAL SCHOOL SERIES

The Royal Princess Readers.

Book I. 8d. Book III. 1s.
Book II. 10d. Book IV. 1s. 3d.
Book V. 1s. 6d.
Book VI. (Lit. Reader No. 1.) 1s. 6d.
Book VII. (Lit. Reader No. 2.) *At press.*



"THE MOST ATTRACTIVE YET PUBLISHED."

The matter is distinguished for its vivacity, its literary quality, and its happy freshness. The **Illustrations** are of remarkably high quality, and comprise not only many well-executed pictures in black and white, but numerous plates in full colour exquisitely reproduced. Alike in letterpress, illustration, paper, printing, and binding, **The Princess Readers** touch the high-water mark of school books.

"I consider them to be the best Readers out."
"Both teachers and scholars are delighted with them."
"They will make friends wherever they go."

"PRINCES AMONG SCHOOL READERS."—*Schoolmaster.*

The Royal Prince Readers.

Book I. 8d. Book III. 1s. | Book VI. (Lit. Reader No. 1.) 1s. 6d.
Book II. 10d. Book IV. 1s. 3d. | Book VII. (Lit. Reader No. 2.)
Book V. 1s. 6d. *At press.*

In this New Series of high-class School Readers the matter is remarkably fresh; the books are distinguished for their literary quality and careful grading. The **Illustrations** are works of art, and comprise not only many well-executed pictures in black and white, but numerous plates in full colour. Alike in letterpress, illustration, paper, printing, and binding, **The Prince Readers** have absolutely no superiors in the market. They may be confidently recommended.

"Second to none." "Delighted with them." "All classes revel in them."

Literature for the Seniors. To follow the "Royal Prince" and "Royal Princess" Readers.

NELSON'S LITERATURE READERS.

Arranged and Annotated by Dr. GARNETT, late of the British Museum.

No. I. Beautifully Illustrated. Price **1s. 6d.** **No. 2.** *At Press.*

****** Nelson's School Circular and Educational Catalogue post free on application.***

T. NELSON & SONS, 35 & 36 Paternoster Row, London, E.C.; Parkside, Edinburgh; and New York.

have the appearance of having been reproduced from rough hand-sketches. On page 2 is a very crude attempt at an illustration of a whirling-table, with half the driving cord missing and the other half in an impossible position. No very great care seems to have been taken with the text. On p. 74 the student is told that the water at the bottom of the ocean in some places has a temperature of 32°—that is, the freezing-point of water—and that the colder waters are at the bottom, because they are heavier; then on p. 95 it is fully explained that water has the greatest density at 39°. The description of Daniell's hygrometer, on pp. 47 and 48, is poor in the extreme, and is such that no student could possibly get a proper idea of the instrument. The drawing, Fig. 20, illustrating the hygrometer is worse than useless, as it represents the stand as being part of the tube containing the ether. It is better to give no picture at all than to give one which is absolutely misleading.

"REVIEW OF REVIEWS" OFFICE.

Portfolio of Coloured Pictures. These pictures have the appearance of original oil and water colours. They have been produced by a colour-type process, and are in every way excellent pictures for school or home use. The portfolio is published at half a crown, and contains the twelve following reproductions:—The Harbour at Venice (Thomas Moran), The Song of the Lark (Breton), The Shepherd's Star (Breton), Berkshire Brook in Autumn (F. Botton Jones), The Chess Players (Portielje), A Summer Day in Holland Waters (Paul Clays), Sunset on Long Island (Thomas Moran), Purity (Henner), Youth (Rondel), The Fortune Teller (Detti), The Wedding Party (Kowalski), Venice (Henry S. Smith). All are of a size suitable for the walls of a schoolroom, and may also be obtained at an increase in cost on specially-prepared mounts 20 inches × 15 inches. They are among the best pictures we have seen, and we are pleased to be able to draw the attention of our readers to so fine and suitable a selection.

SIMPKIN, MARSHALL, HAMILTON, KENT, AND CO.

Dr. Cornwell's School Geography. (90th edition.) **Dr. Cornwell's Geography for Beginners.** (70th edition.) There was a time when *Cornwell's Geography* was the most popular, if not the only, text-book on the subject—the number of editions through which it has passed is sufficient evidence of this; but the book was, in its original form, *dry*, and demanded a powerful memory. The present editions have been thoroughly revised and added to by Mr. Ben Jonson, rendered more readable and far more interesting, and brought completely up to date. Both books will doubtless enter on a long lease of new life.

Simple Essays. By M. Macmillan, B.A. This book is prepared by the principal of Elphinstone College, Bombay, and seems to be intended for Indian students. Many of the essays deal with matters relating to Indian customs and geography. An outline of each essay is given. In style the essays are very simple, the sentences being generally too short for fine writing, but no doubt in that very respect better suited to pupils to whom English is an acquired tongue. The essays have a serious fault in not being divided into paragraphs.

SWAN SONNENSCHEIN AND CO.

An Advanced English Syntax. By C. T. Onions, M.A. This book belongs to the "Parallel" Grammar Series, the guiding principle in which is to compare the constructions and grammatical usages of other languages with the one immediately under consideration; so, for instance, in this book English idiom is compared with that in French, German, Latin, or Greek.

English grammar may be taught for two different purposes—first, that of enabling one to speak and write our language correctly. Little is actually necessary for this, and the wise teacher gives plenty of exercise in composition, and but little in parsing. The second purpose is that of utilising English grammar as a basis for the proper understanding of the grammar of another tongue; and in this one cannot be too thorough. For schools and colleges where other languages are taught this will be a very valuable book.

We believe that the author has dealt with every difficulty of English syntax, and in discussing disputed points and common errors the comparison of several tongues makes the treatment more logical and less dogmatic than is usual in this subject.

Some original methods in the chapter on analysis are interesting. The author analyses as sentences infinitive clauses such as "Myself to be a perfect stranger," object clause to "I considered." Under the heading of agreement of verb and subject we get the explanation of such apparent irregularity as occurs in "The lowing herd wind slowly o'er the lea," and "The mind and spirit remains invincible." We notice some useful paragraphs on verbs constructed with a fixed preposition—for example, to laugh at = to ridicule. Another good section deals with direct and indirect speech.

Writers on grammar are nowadays much less dogmatic than their predecessors were. Mr. Onions has excuses for very many forms of speech which are generally called errors. Why, then, still cling to the belief that the "split infinitive" is incorrect? Phrases like "to never see thy face again" have been ridiculed by critics for many years; but why? Old English writers employ the idiom. The adverb is more emphatic and more closely conjoined to the verb here; and if the infinitive "see" is to be regarded as a noun governed by the preposition "to," then "to never see" must be as correct as "to no country."

The grammatical terms are sometimes different from those in general use, but this results from attempting to use terms which are the same in all languages.

F. WARNE AND CO.

Nature Stories for Little Folk. By E. Carter and E. Field. The authors of the above-mentioned work have made a praiseworthy attempt to imbue the rising generation with a love of Nature, by selecting a number of incidents relating to out-door life, and weaving them into the form of attractive narratives. The subjects dealt with are for the most part familiar. All unnecessary details and technical terms have been eliminated, but at the same time no point of vital importance is absent. A few of the bird illustrations might be improved upon with advantage, and made more characteristic of the creatures they are supposed to represent; but taken all round, Messrs. Warne's new publication, by reason of the light, entertaining manner in which it is written, should tend to arouse the interest, and prepare the young reader for a deeper study of Nature's works.

Wayside and Woodland Trees. By Edward Step, F.L.S. This excellent little volume is admirably described in the words of the author as "a pocket guide to the British sylva," intended "to afford a straightforward means for the identification of our native trees and larger shrubs, for the convenience of the rural rambler and nature lover."

Every man to his trade. In the woodyard and sawmill, trees are usually identified by their bark; the cabinet-maker knows them by the texture and grain of the wood; the casual rambler and amateur botanist is content, as a rule, to know their leaves and flowers. While this has obvious advantages from a teacher's standpoint, lending itself to leaf-mounting and nature-drawing from these, it has equally obvious shortcomings, and that is why so very few people are able to identify a tree in winter. But if nature study means anything at all, it surely includes the observation of the object in all its bearings and under varying conditions. Mr. Step has carried out a systematic survey of British trees, covering one hundred and one species; and it will give an idea of the completeness of this little work to say that over a score of willows are distinguished, and no fewer than seven poplars. On the other hand, the claims of well-known exotics have been fully recognized, from the Oriental plane tree, now so common in London, to the "monkey-puzzle" of suburban gardens.

The method of illustration deserves special praise. Of each native tree two photographs are given in the same "position"—one showing its summer and the other its winter aspect; so that the architecture of the tree, as well as its landscape feature, receives full attention. A third photograph at close quarters shows the bole with all its peculiarities of bark and growth, while a woodcut illustrates the outline forms of leaves, flowers, and fruit. No fewer than one hundred and twenty-seven photo plates are used in this way, besides many drawings, and a botanical appendix exhibits the trees in question under their natural orders.

Trees, like ferns, form a well-marked natural class, and are, therefore, admirably suited for amateur study, since they are sufficiently distinct from other plants, and yet retain so many class differences as to cultivate observation and judgment. No better book could be recommended for an ideal country holiday.

WILLIAMS AND NORGATE.

French Phrases, with Exercises. By H. E. Haig Brown, M.A. We expected to find a book beginning with conversational phrases, and leading up to a few essentials of grammar; but the book is arranged on the basis of the old grammars, with lists of "six nouns ending in *-ail* which change *-ail* into *-aux*," and "seven nouns in *-ou* which take *-x*." Later on in the book idiomatic sentences are given in illustration of the uses of irregular verbs, etc. The book is well set up in bold type and carefully printed, although *tout les deux* (page 11) should be *tous les deux*, and *montrè* (page 43) should be *montré*.

28 SE 1904

THE
AUTUMN
PATTERNS
ARE NOW READY.

B.B.

Send a post card for them—they will cost you nothing, as we pay carriage both ways.

BEST { Styles. Qualities. Values. } DRESS GOODS { At all prices, for all purses, and for all purposes.

The collection contains the best of all classes:

AMAZONS, FACED CLOTHS, HABIT CLOTHS, CHEVIOTS, TWEEDS, HOPSACKS, FANCY SUITINGS, &c.

The B.B. SERGES—special make—in BLACK, NAVY, CARDINAL, and CREAM, 16d. to 3/2 per yard, ordinary or "Pirle" finish.

A Selection of the most Fashionable Blouse Cloths.

A post card specifying what you want will bring a variety to choose from at your leisure.

All Goods sent Carriage Paid in the United Kingdom.

TERMS: Cash with Order.

"The Queen" says: "Best's Dress Goods Co., Bradford, are striking out an exclusive line in supplying only exceptionally first-class goods."

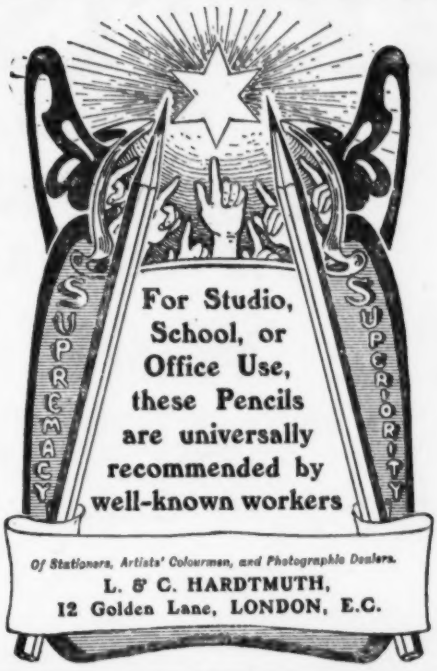
BEST'S DRESS GOODS Co., BRADFORD.

See the B.B. stamp on every length.

Please name this paper when writing.

The Best for all who Draw.

HARDTMUTH'S KOH-I-NOOR.


SUPREMACY
SUPERIORITY
For Studio, School, or Office Use, these Pencils are universally recommended by well-known workers

Of Stationers, Artists' Colourmen, and Photographic Dealers.

L. & C. HARDTMUTH,
12 Golden Lane, LONDON, E.C.

DELICIOUS COFFEE.

RED
WHITE
& BLUE

FOR BREAKFAST & AFTER DINNER.

In making, use less quantity, it being so much stronger than ordinary COFFEE.

England's Best Value

"BONGOLA"
TEA

Has no Equal

NATURE STUDIES AND FAIRY TALES
FOR INFANT SCHOOLS AND LOWER CLASSES.

By CATHERINE I. DODD,
Lecturer in Education at the University of Manchester.

With Special Introduction by W. SCOTT COWARD,
Late H.M. Inspector of Training Colleges.

☞ This Book contains a CORRELATED PROGRAMME OF WORK for Infant Classes, embracing FAIRY TALES, POETRY, NATURE STUDY, DRAWING, etc. Full theoretical explanation of principles is given; but the important fact for most Teachers is that it contains a Course of LESSONS WORKED OUT IN FULL DETAIL, and with complete correlation between the Stories and the Nature and other Studies, as well as between the consecutive Lessons in each branch. It forms the BEST PRACTICAL MANUAL OF HERBARTIAN METHOD applied in accordance with the teaching of Froebel.

The Studies in the pages of this book are more than theoretical lessons. They have originated in the KINDERGARTEN and CLASSROOM, and have formed the plan of lessons given in Spring by Students and Teachers to the little ones in the Primary School and Kindergarten, Manchester.—*Extract from Introduction.*

The work specially meets the need of **FIRST YEAR STUDENTS IN TRAINING COLLEGES,** and will be found invaluable to **ALL TEACHERS IN INFANT AND JUNIOR SCHOOLS.** Fully Illustrated in Black and White, and Fifteen Coloured Plates. Price **3s. 6d.**

THOMAS NELSON AND SONS, 35 and 36 Paternoster Row, London, E.C.;
PARKSIDE, EDINBURGH; AND NEW YORK.

.. THE ..

BRITISH ISLES

Is the Latest Volume of

THOMAS NELSON & SONS'
NEW GEOGRAPHICAL READERS

The World and its People.

A SERIES OF MODERN GEOGRAPHICAL READERS, ADAPTED TO THE SPECIMEN SCHEMES OF THE BOARD OF EDUCATION.

This Volume contains 304 pages, 16 Coloured Plates, and numerous Maps and Black-and-White Illustrations. Cloth.

Price I/6.

Messrs. T. NELSON & SONS claim that the books of this Series are the most attractive and instructive Geographical Readers ever issued in this country. They are written in a bright, picturesque style, and describe in a simple but thoroughly interesting way the various aspects, physical, political, and ethnographic, of the countries with which they deal. As Supplements to the Geography lesson they are unrivalled, and the children enjoy them as much as story books. The illustrations are of remarkably high quality, and comprise not only many well-executed illustrations in black and white, but numerous plates in full colours. The Maps, too, are a special feature. These books have earned the hearty commendation of educational experts and the educational press.

LIST OF THE SERIES.

First Steps in Geography	128 pp.	8	Coloured Plates.	10d.
Sea and Land . .	160 pp.	8	,,	1s.
England and Wales .	208 pp.	8	,,	1s. 3d.
The British Isles . .	304 pp.	16	,,	1s. 6d.
Europe	272 pp.	16	,,	1s. 6d.
America	286 pp.	8	,,	1s. 6d.
Africa	202 pp.	8	,,	1s. 6d.
Australasia . . .	208 pp.	6	,,	1s. 6d.
Asia	360 pp.	16	,,	1s. 6d.
The World . . .	416 pp.	32	,,	2s.

The books in this Series have been adopted by the London County Council Schools.

The "EUROPE" in this Series is in use at Eton.

SOME RECENT OPINIONS.

"A well planned, instructive, and attractive series."—*Educational Times.*

"An excellent series of readers."—*Schoolmistress.*

"The illustrations are of the high character which the Messrs. Nelson have long led us to expect."—*The Schoolmaster.*

"It (the series) unapproachable distances every other of its kind."—*The Educational Review.*

One of H.M. Inspectors writes:—

"They are excellent in every respect. No better series has yet appeared, and I am glad to see them in use in some of the schools in my district."

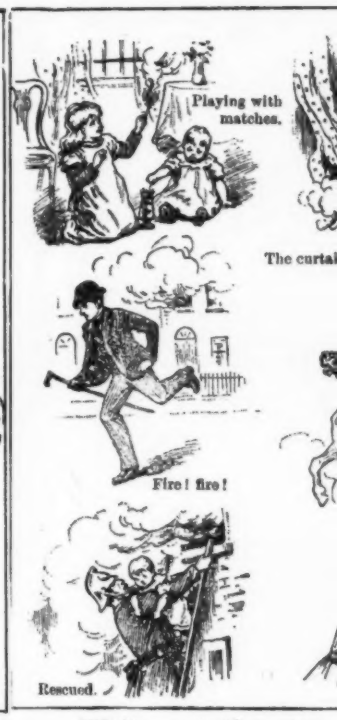
Nelson's School Circular and Educational Catalogue post free on application.

T. NELSON & SONS, 35 & 36 Paternoster Row, London, E.C.; Parkside, Edinburgh; and New York

Presented with No. 4, Vol. XXV., of THE PRACTICAL TEACHER,
October 1904.

Write out the story pictured above.

Write out the story pictured above.



Write out the story

Write out the story pictured above.

Write out the story pictured above.

Write out the story

Write out the story pictured above.

Write out the story pictured above.

Write out the story

t the story pictured above.

Write out the story pictured above.

Write out the story pict

the story pictured above.

Write out the story pictured above.

Write out the story pict

t the story pictured above.

Write out the story pictured above.

Write out the story p

PICTURES FOR C

Cut out the Pictures, and give one to each child as

e out the story pictured above.

Write out the story pictured above.

Write out the story pictured abov

e out the story pictured above.

Write out the story pictured above.

Write out the story pictured abo

e out the story pictured above.

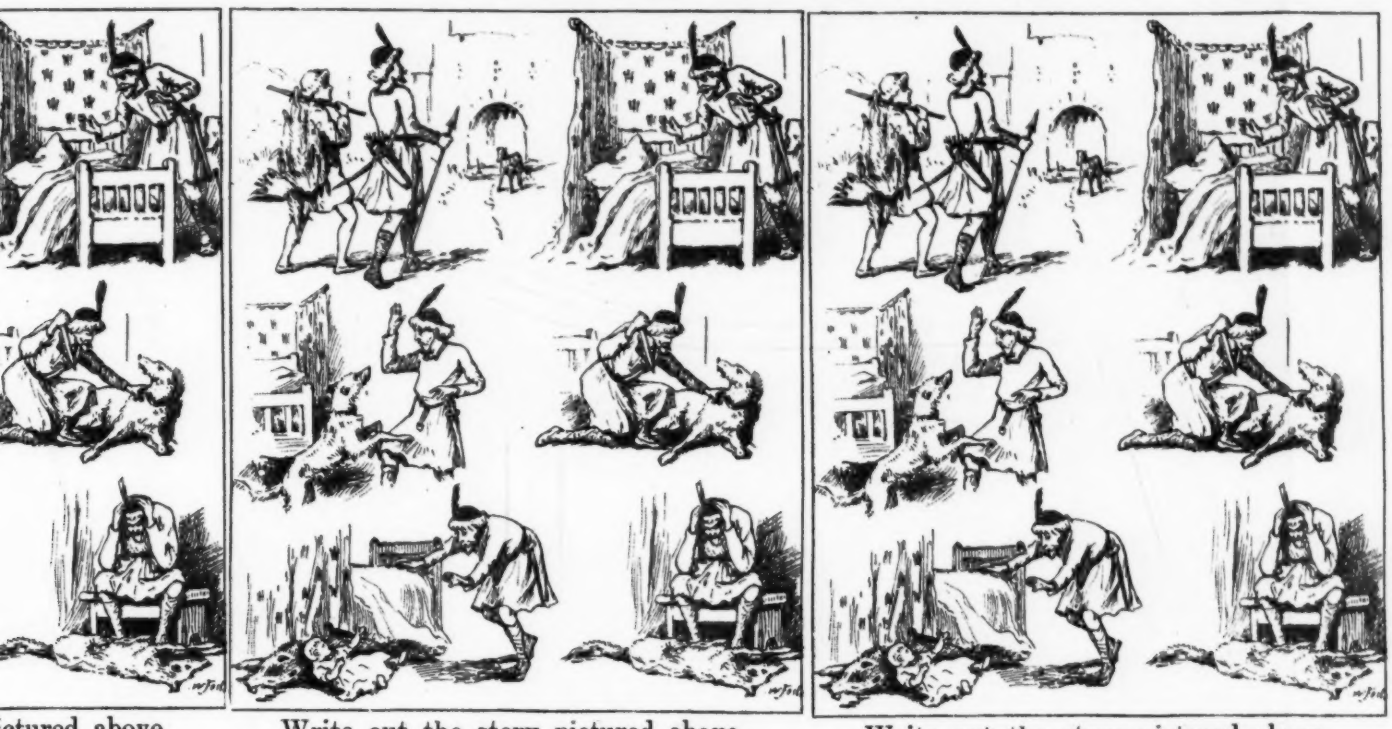
Write out the story pictured above.

Write out the story pictured ab

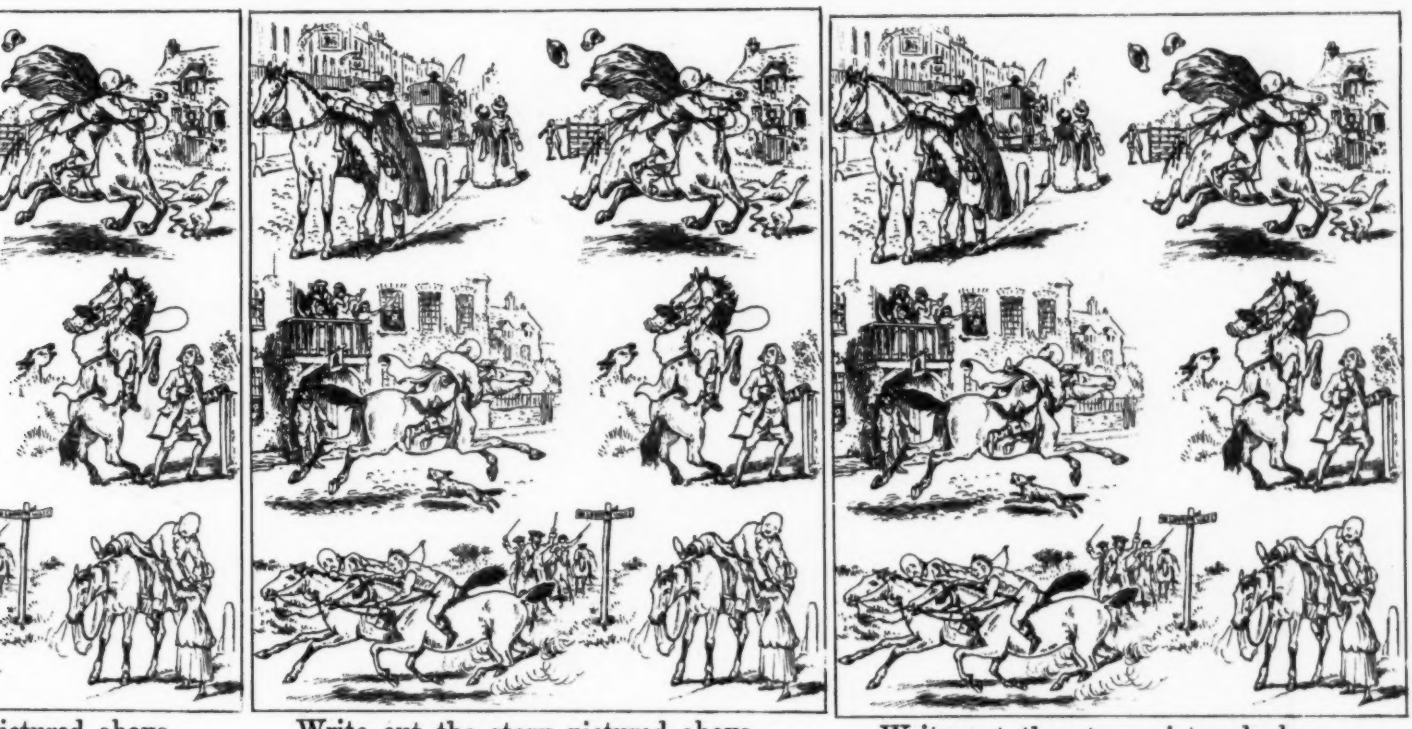
FOR COMPOSITION.

each child as the subject of its Composition Exercise.

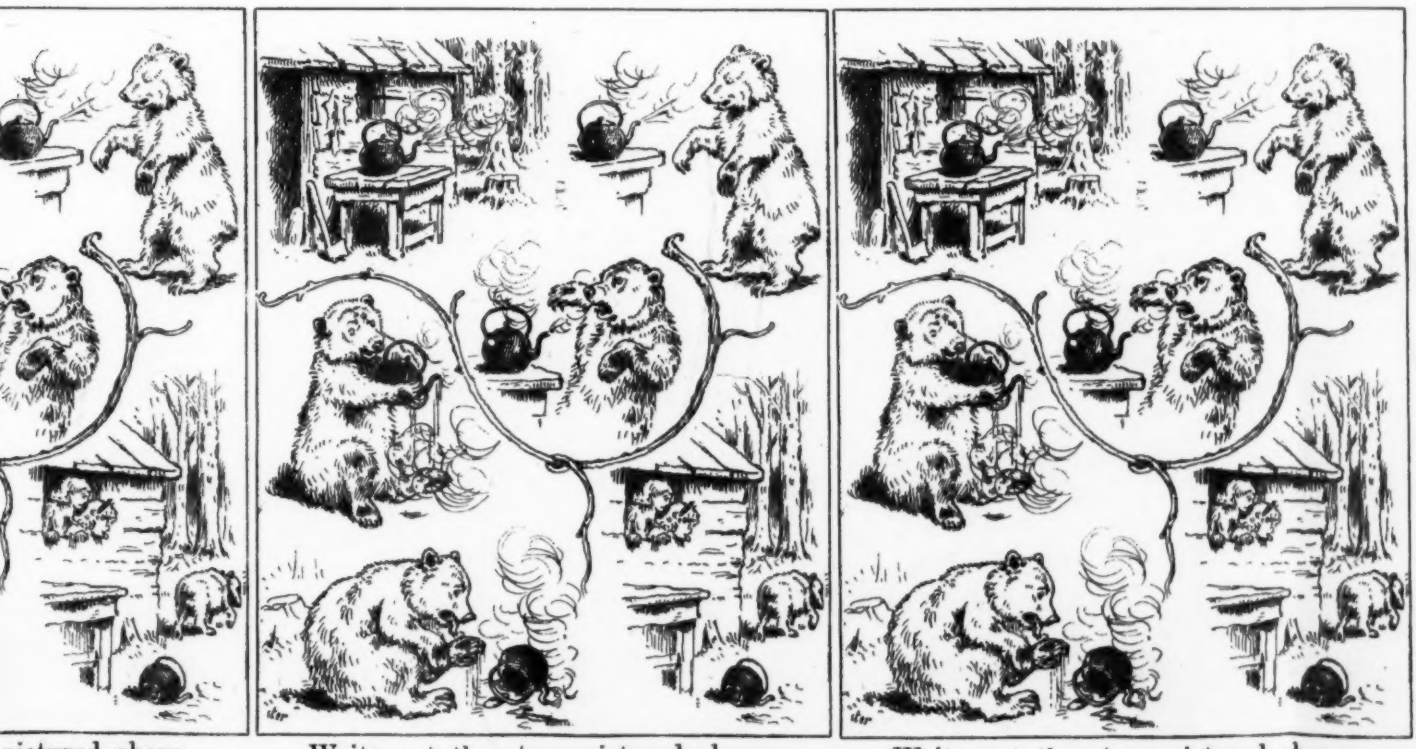
These Illustrations are specimens of the pictures in Nelson's Illustrated Composition Books, the pioneer books on this method in Great Britain.



ictured above. Write out the story pictured above. Write out the story pictured above.



ictured above. Write out the story pictured above. Write out the story pictured above.



pictured above. Write out the story pictured above. Write out the story pictured above.

King's Scholarship . . Examinations, 1904-5.

The following books are prescribed for General Reading:—

1904 and 1905. DICKENS.	1904. SCOTT.	1905. SCOTT.
DAVID COPPERFIELD.	KENILWORTH.	THE TALISMAN.

NELSON'S
NEW CENTURY LIBRARY
POCKET EDITIONS

of the above are the BEST for Candidates.

Printed in Large Type on Royal India Paper.

Size 6½ inches by 4¼ inches. Half inch = 1,000 pages.
Slips easily into the pocket.
Cloth extra, 2s. net. Limp leather, 2s. 6d. net. Leather boards, 3s. net.

Extract from a letter from the Principal of a large P.T.'s Centre:—

"We have always induced our Pupil Teachers to obtain editions which minister to the eye, the touch, and the book-loving instinct generally, and your India Paper Editions undoubtedly do this."

☞ ***Order from Bookseller Nelson's New Century Library Pocket Editions.***

THOMAS NELSON & SONS,
35 and 36 Paternoster Row, London, E.C.; Edinburgh; and New York.

THE NORMAL PRESS.

31 TOP NAMES.

At the last King's Scholarship Examination (1904 List) 32 Candidates passed in Divisions I. and II. of the First Class. Of these no less than 31 Candidates used books published by the Normal Press.

FIRST DIVISION OF THE FIRST CLASS.

Miss Margaret Ann Smith.—"I am pleased to be able to say that I used your **Notes on Thackeray's 'Esmond'** in preparation for Scholarship. Your Guide to the King's Scholarship was very helpful to me. Our tutor also used your **'General Information Test Papers.'**"

Miss Amy Wilson.—"In my preparation for the King's Scholarship I found your **'General Information Papers'** most useful, and Brayley's **'As You Like It'** was also a splendid book for examination purposes."

SECOND DIVISION OF THE FIRST CLASS.

Miss Dorothy Court.—"I found your **Notes on Thackeray's 'Esmond'** of great help in preparing for that portion of the English paper at the Scholarship Examination."

Miss Dorothy Finch.—"When preparing for the Scholarship I used your **'Scholarship Guide'** and **'General Information Test Papers'** and **'Key,'** all of which I found exceedingly useful."

Miss Charlotte E. Hardy.—"In studying for the King's Scholarship I found your **'General Information Questions'** very useful and comprehensive, and also thought your Introduction and Notes on the **'Task'** very good."

Miss Emily M. Hewetson.—"I feel that I owe a large part of my success to you, and, in particular, I can recommend to all students your book of questions on **'General Information.'** I relied entirely on this book, working through each paper, and then correcting my work by your invaluable **'Key.'** This was all I attempted in preparation for the General Information Paper in the Scholarship Examination, and I am convinced that my marks for that subject must have raised my position considerably."

Miss Marion M. Hill.—"In preparing for Scholarship Examination, 1903, I used several of your books, all of which I found very useful. They were recommended by our Centre (Hackney). I found these works of great value to me—Brayley's **'As You Like It,'** Raybould's **'The Task,'** Book V., the **'Normal General Information Papers'** and **'Key'** to same, as well as **Normal Notes on 'Esmond.'**"

Miss Kathleen Hogan.—"I have used your **'Scholarship Guide'** and your **'General Information Test Papers,'** and have found both of great use in preparing for King's Scholarship."

Miss Annie Milburn.—"I am pleased to be able to say that I have obtained very valuable assistance from your **'Test Papers in General Information'** in preparing for the Scholarship Examination. I also found your **'Typical Deductions from Euclid'** very useful, and received many valuable hints from your **'Scholarship Guide.'**"

Miss Harriet Nora Ormrod.—"I used your **Notes on Thackeray's 'Esmond,'** and found them useful. The notes are well classified for purposes of study."

Miss Harriet C. Rogers.—"I derived much help from your *publications* and the **'Scholarship Guide.'** The books of which I made most use were **Notes on 'Henry Esmond,' 'As You Like It,'** and **'The Normal Model Essays.'**"

Miss Nellie Snape.—"I am glad to have this opportunity of thanking you for the help I have received from your publications. Your **'General Information Questions'** and **Cowper's 'Expostulation'** were extremely valuable to me."

Miss Elizabeth J. Sutton.—"In working for the Scholarship I used your **'General Information Test Papers,'** and also borrowed from a friend who was working for the same examination your **'Model Essays.'** I may say both books proved very useful to me during my period of hard study."

FIRST DIVISION OF THE FIRST CLASS.

Mr. A. E. Silvester.—"In preparation for the Scholarship Examination I used your edition of **'Quintus Curtius,'** set for Scholarship, and the **'Interlinear Translation.'** I could not possibly have found a better edition to work from."

Mr. W. Reader Bullard.—"In my second year at the Walthamstow P.T. Centre I used your **'Paradise Lost,'** and found Mr. Ikin's notes very clear and full."

SECOND DIVISION OF THE FIRST CLASS.

Mr. Benjamin Archer.—"In my preparation for Scholarship I used your edition of **'Quintus Curtius'** and the **'Translation'** of the same. I consider them two excellent works. I also found your **Guide** of much service, as well as those capital little books, entitled **'Knotty Problems in Arithmetic,'** etc."

Mr. H. S. Brown.—"I may say that I used *many* of your publications in preparation for Scholarship, and found them very useful, especially those dealing with **'Knotty Points'** in the various subjects."

Mr. George Davison.—"I used a *number* of your books in my preparation for K.S., and found them very helpful. The exhaustive manner in which the subjects are treated makes these books invaluable to the Scholarship student."

Mr. L. P. Brown.—"In preparing for the Scholarship Examination I found your **'Theory of Music,' 'Knotty Points in Analysis and Parsing,'** and **'Knotty Points in Arithmetic'** of the greatest service. They are so concise, and at the same time accurate, as to exactly suit their purpose."

Mr. Harry Mellor.—"I obtained a great deal of help from your **'Scholarship Guide.'** The **'Hints for the Examination Room'** certainly saved me a lot of marks, and thus helped me to secure a much higher position than I otherwise should."

Mr. Chas. T. Tyson.—"I used *several* of your books in preparation for King's Scholarship, and found they treated very fully on the subjects concerned. Your **Notes on Thackeray's 'Esmond,' 'Quintus Curtius,' 'History of Alexander,'** Book VIII., **Cowper's 'Task,'** Book V., and **'General Information'** were especially well adapted to the purpose."

Mr. Hy. Potts.—"During last year I used *five* of your publications in preparing for the Scholarship—namely (*a*) **'Knotty Points in Analysis and Parsing;'** (*b*) **Model Paraphrase of 'As You Like It;'** (*c*) **'Teacher's Music Course'** (both Notations); (*d*) **'The Metric System Made Easy;'** (*e*) **'Algebraic Factors Made Easy.'**"

Mr. S. E. Starling.—"While working for Scholarship I used your **'Scholarship Guide'** and **'General Information Papers,'** with the **'Key'** to same. I found them very useful indeed."

Mr. H. Shoesmith.—"The **'Normal Scholarship Guide,' 'Expansion of the British Empire,'** and the **'General Information Test Papers'** were most useful to me in my preparation for the Scholarship Examination. They supply a real need. No Scholarship student should be without them."

Mr. John E. Renwick.—"I have derived much information from your publications, such as **'Knotty Points in Arithmetic'** and **'The Teacher's Music Course'** and *several others*, as well as the **Free Guides.**"

Mr. Wm. Palfrey.—"In preparation for the King's Scholarship Examination, I found the following books very useful indeed:—**Notes on Thackeray's 'Esmond,' 'Interlinear Translation of Quintus Curtius,'** Book VIII., **'General Information Test Papers,' 'Key to General Information Test Papers,' 'Knotty Points in Analysis and Parsing,' 'Teacher's Music Course.'**"

Mr. E. Doggart.—"In preparing for the King's Scholarship Examination I used your **'King's Scholarship Guide,'** and also your **'General Information Questions,'** both of which I found exceedingly useful."

Mr. John E. Love.—"While preparing for Scholarship I made use of (*a*) **'Quintus Curtius;'** (*b*) **'General Information Papers;'** (*c*) **'Key'** to same."

Mr. A. H. Ives.—"In preparing for the recent King's Scholarship Examination I used your **'Glossary of Historical Terms,'** and found it very useful."

Mr. A. L. Giles.—"I found your **'General Information Test Papers'** of great service. I also used your excellent edition of **'Alexander the Great.'**"

Mr. H. P. Gibbings.—"I found your **'Scholarship Guide'** and **'Knotty Problems in Arithmetic'** of the greatest assistance to me."

Mr. H. Chas. Foster.—"I derived great benefit from some of your books, especially the **'General Information Papers.'** I also got some very useful information and hints from your handy little **'Guide to Scholarship.'**"

LONDON: THE NORMAL PRESS, 47 MELFORD ROAD, DULWICH, S.E.; or, 110 AVONDALE SQUARE, S.E.

COUPON
PRACTICAL TEACHER
October 1904

PRINTED AND PUBLISHED BY THOMAS NELSON & SONS, PROPRIETORS, AT THE OFFICE OF "THE PRACTICAL TEACHER," 35 & 36 PATERNOSTER ROW, LONDON, E.C.